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The JOURNAL of AGRICULTURE

Of The Department

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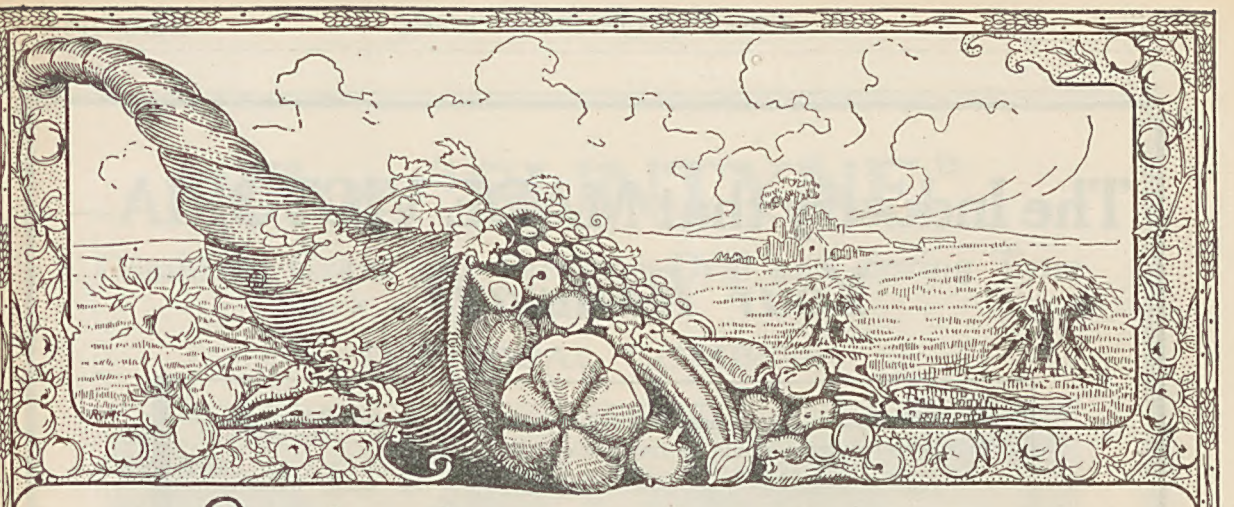

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Issued under the direction of the Hon. J. Allan, M.L.A., Minister of Agriculture.

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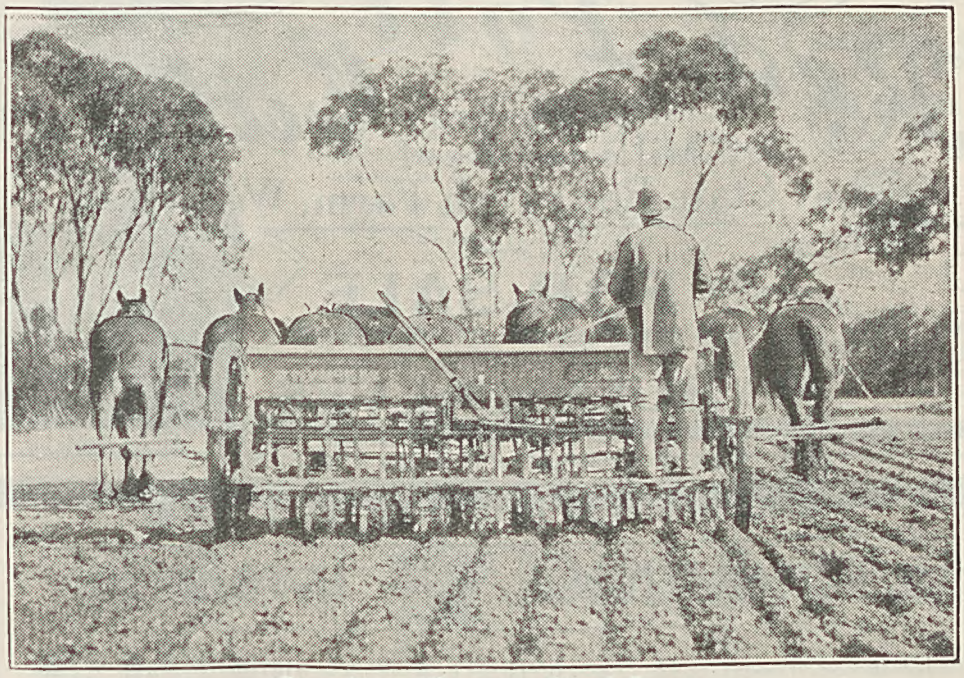

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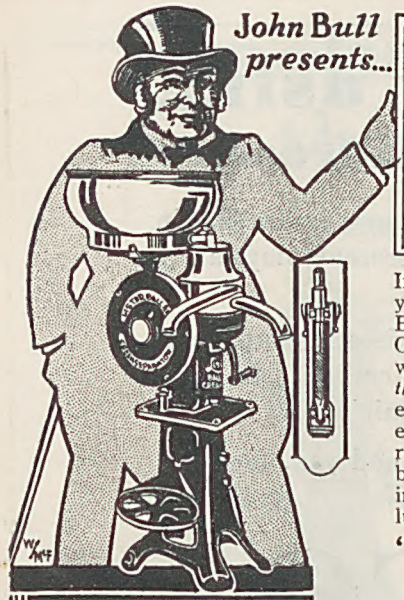

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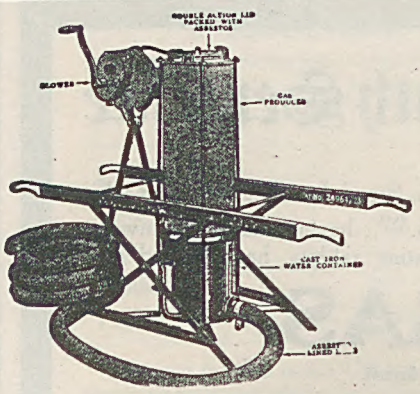

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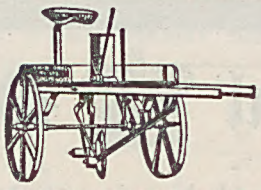

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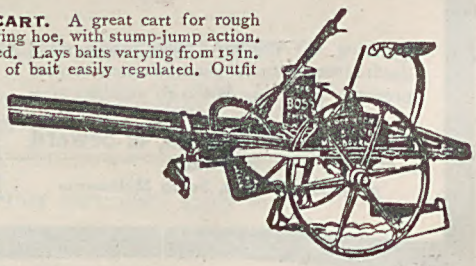

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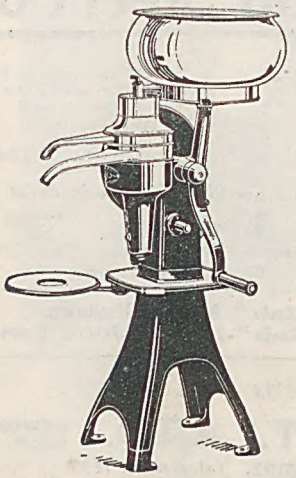

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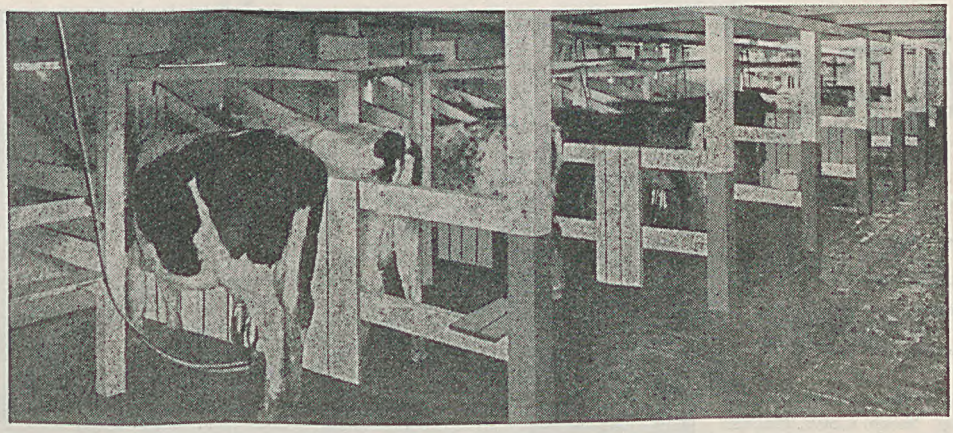

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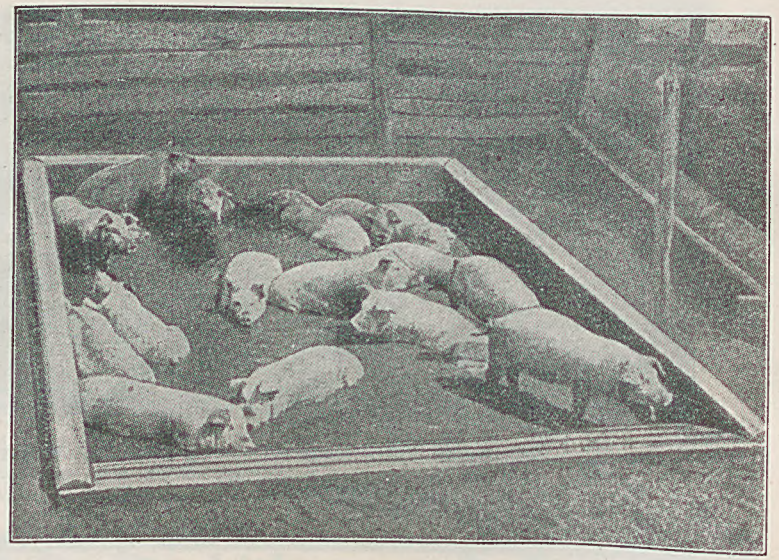

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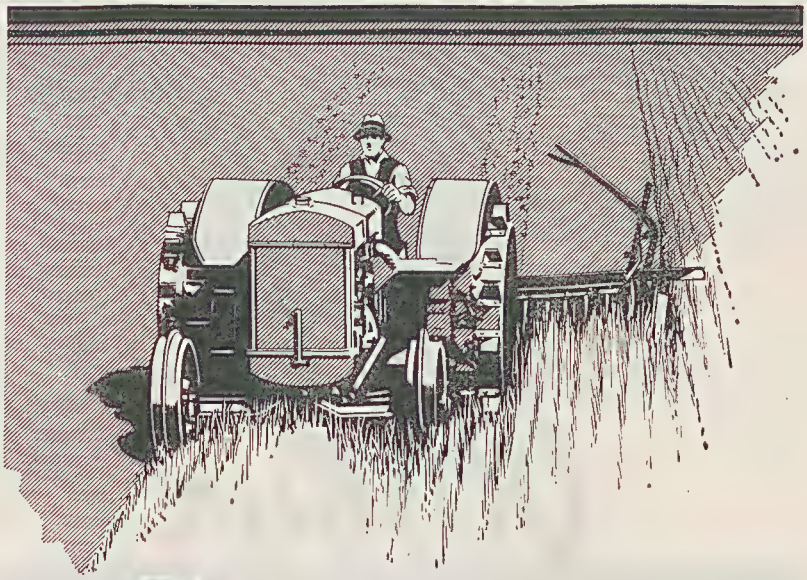

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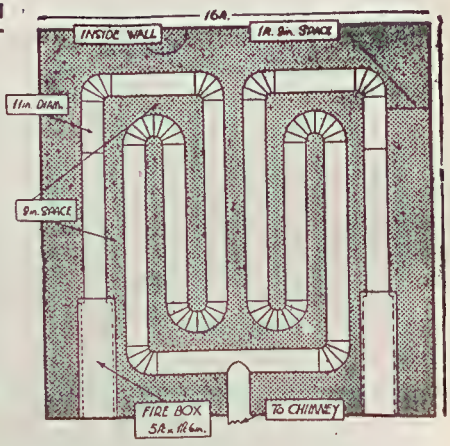

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The Journal of the DEPARTMENT of AGRICULTURE of VICTORIA

The Sowing and Management of Pastures

By J. E. Harrison, B.Agr.Sc., Senior Agrostologist

DURING April farmers in many districts will be busy seeding down new pastures. In most cases, of course, the land has already been prepared, though, in others, it may be proposed to sow down cropping land which can be got ready quickly. It is important that the seed-bed should be clean, with a fine tilth and a firm surface. These requirements are secured by frequent cultivation, especially by several shallow workings after the first ploughing, and by the action of rain. It is of advantage also if sheep or cattle have been run on the land, as they compact the soil with their tramping, and only a light surface cultivation is needed to put it in excellent order for sowing.

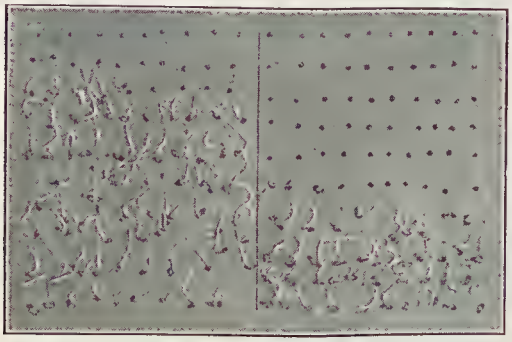
A clean seed-bed will be free not only of weed plants, but also of weed seeds. To clean the land of weed seeds one has to secure their germination and then destroy the seedlings. This is done by having the soil worked down fine so that the weed seeds will strike with the first good rain of 30 points or more. From three to six days later the harrows may be brought into operation if the weather is suitable and the soil in good order for working. A stroke both ways will kill the weed strike and clean the land ready to receive the pasture seeds.

As soon as the soil is prepared and it is time to sow, the actual operation of putting in the seed should be undertaken at the first opportunity. Early sowings are most likely to experience favorable conditions. The soil has been warmed with the heat of summer and moistened with the first autumn rains, so that ideal conditions prevail for the germination of seeds. The different kinds of seeds which make up a pasture mixture will each have an equal chance to germinate, grow and form a well-balanced pasture. Early sowing also allows the plants to become well rooted and strong before the winter sets in; they are better able to compete with winter growing weeds and to resist the attacks of slugs, insects, and disease. The pasture is also ready for grazing earlier than a field sown late.

The actual sowing of the seed should be accomplished carefully and thoroughly. Usually the seed is sown on the surface of the soil and covered lightly with the harrows, though in moderately dry districts, rye-grass is often drilled in at a shallow depth, frequently on top of oat stubble.

There are several methods of sowing, but probably the ordinary wheat drill is most widely used for the purpose. Rye-grass seed may be sown separately through the seed-box, but a mixture is most conveniently sown with the manure through the manure box, the tubes being taken out of the hoes so that the seed may fall on the surface of the soil. The method of mixing is simple, the manure being spread out on a smooth floor or other surface, covered with the seed, and the lot then turned over several times with a shovel. As the superphosphate is acid, and will injure, and perhaps destroy the seeds of the mixture if allowed to

stand even for a few hours, it is necessary to sow without delay. It will be found that the seed tends to work to the surface in the manure-box, but if the box is filled only one-third full, the trouble is not appreciable. It is convenient to carry an extra butt or so on the footboard, so that the box may be replenished as often as necessary.



Germination Test showing the difference between good and bad seed.

Another method of sowing is by means of a hand broadcasting machine, a very useful implement, but not always giving an equal distribution of seed over the field. It throws heavy seeds further than light kinds, and for this reason, when broadcasting it is best to sow the field in two operations. If this is done the heavy seeds may be mixed together first and sown separately in one direction, the light seeds being sown later at right angles. It is desirable to observe much the same precautions when broadcasting by hand, though more care still is necessary to secure a uniform sowing over the whole field.

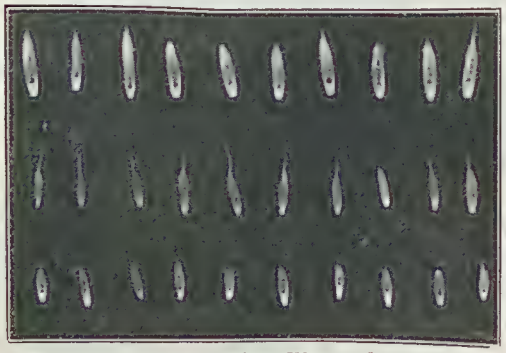
A simple and effective implement called a barrow seed drill is used largely in England. This consists of a wheelbarrow which carries a drill operated by a drive from the barrow wheel. It is a light, workable implement, and so far as can be ascertained gives excellent results.

Whatever the manner of sowing, the important point is to secure an even distribution over the whole field. Very light harrows should be used to cover the seed, and the operations should then be completed by rolling —twice for preference—with a roller of moderate weight. Chain harrows are a very suitable implement with which to cover the seed, and often brush harrows, made of boughs and the small branches of trees, are used successfully for the purpose.

An application of superphosphate made at the time of sowing will remedy a natural deficiency of our soils, and will make available a plant food of which pasture seedlings, especially clovers, stand in high need. It is known from experiment that the phosphatic requirements of a plant are highest when it is young, and so it is of more advantage to apply the manure when the seed is sown than at any other time. If the seed and manure are sown together through a drill, the manure falls in intimate contact with the seed, and very satisfactory conditions prevail for seedling growth. If the seed is broadcast, either by machine or by hand, it is highly desirable that the superphosphate should be applied at the same time to be available to the young plants from their first stages of growth.

If good seed of suitable strains has been used, and sowing has been carried out carefully and intelligently, as much as possible has been done to lay the foundation of a sound and satisfactory pasture. Given favorable seasons, its subsequent development will depend upon management, or the system of grazing and manuring adopted, as well as upon harrowing, mowing, and the like.

In the first year only moderate grazing should be given a new pasture. The young plants need lenient treatment if they are to make adequate root growth and produce abundant leaf in subsequent years. It has been shown by experiment that severe grazing



Rye-grass seeds: Top, Wimmera; centre, Italian; and lower, English rye-grass.

restricts root development to such an extent that weakly and short-lived plants may result. The first grazing of an autumn-sown pasture should seldom be given before August, when it is best to turn in a large number of stock, graze the field rapidly, and then turn the stock out again. In a good growing season,

such grazing may be given every three or four weeks throughout the spring, but care should be taken to leave a few inches of leaf on the pasture before the summer sets in. The leaf will shade the soil, protect the surface roots, and conserve moisture, as well as give protection to the young buds located in the crowns of the plants. The plants will continue to strengthen also, and will be ready to sprout again with the first autumn rains.

On established pastures an application of a soluble phosphatic manure early in the autumn is commonly desirable. This will stimulate autumn growth and again strengthen the plants to withstand the rigors of winter. It will make more feed available during the winter months, especially if the field is closed during May, and full advantage taken of the last favorable weather for plant growth before the winter sets in.

The accumulation of animal droppings on the pasture should also be dealt with during autumn. These droppings, if left, cause rank growth with uneven grazing as the result. Various sorts of harrows are used for spreading the manure, a combination of zig-zag and chain harrows probably giving the best result. A further harrowing often is desirable at the end of winter before spring growth commences. This is especially the case with old pastures. In either case the objective should be to clean the field ready to make even and uniform growth, so that the stock may take full advantage of every blade that grows.

The grazing of a pasture should be regulated as far as possible, especially during periods of vegetative activity, usually autumn and spring, so that short periods of grazing alternate with longer periods of rest. A pasture plant is stimulated to make new vegetative growth by moderate browsing, but it requires a period of rest in which to make that growth. Continuous grazing weakens a pasture plant often beyond recovery, and should be carefully avoided, especially during autumn. A pasture continuously grazed yields less nutriment per acre than one alternately grazed and rested. Unfortunately, many farmers often find themselves so short of grass, hay, and other food supplies that they are obliged to give their stock the run of the whole farm. As soon as possible, however, the fields should be alternately grazed and rested again, and the plants given the opportunity to recover from the check of constant browsing.

Summary.

The main points gone over may be briefly recapitulated. We regard the pasture seedling as a delicate organism, which should grow up under as favorable an environment as possible. Suitable conditions for germination are the first essential—a warm, moist soil, with a fine tilth and a firm surface. Once the seeds have germinated, the seedlings should not be obliged to compete with weeds, and the sower should have his land free of weed seeds as well as of weed plants. The young pasture seedling is known to need abundant plant food in a readily available form, and if phosphates have been applied at the time of sowing, the young plants will rapidly develop size and strength and take possession of the field as a crop is intended to do. Root development will proceed and sturdy plants will be formed. Grazing should be judiciously given the young pasture. Light grazing acts like a pruning, and causes the plants to stool or send out fresh shoots, and thicken up the sole of the pasture. At the same time it prevents tall-growing plants from overshadowing and crowding our low-growing plants like white clover. Continuous or too frequent grazing should be carefully avoided, however, as it weakens each plant in much the same manner as too frequent pruning would weaken a fruit tree.

It is useful to realize that a pasture is made up of single plants. It is the influence of treatment or management on each individual plant which affects the pasture as a whole, and if we study the single plants of our pastures we will appreciate better the result of each operation we perform upon the pasture as a whole. It is this "single plant" view which is one of the main features of pasture investigation to-day, and is proving so well worth careful study. It simplifies the problems of choosing species, selecting strains, and caring for and managing pastures, and will help the farmer considerably if he makes it the basis of his own pasture studies.

The important subject of mixtures has not been dealt with in this short article, nor is it wise to prescribe a mixture without fairly full knowledge of all the conditions which may influence the choice of species. The underlying principles, however, were discussed in an article on "Establishing Mixed Pastures," which appeared in the February issue of this *Journal*.

Warragul Meadow Competition, 1932

Report of Judge—J. E. Harrison, B.Ag.Sc., Senior Agrostologist.

AN excellent season prevailed throughout northern Gippsland last spring, and some heavy crops were entered in the third annual meadow competition conducted by the Warragul and West Gippsland Agricultural Society. There were 30 entries compared with 17 in the previous year, and 22 in the first season. Lardner was well represented by six entries, Warragul by seven, and Drouin South, Ellinbank, Nilma North, Buln Buln, Rokeby, and Lillico by several each. These areas, all hilly or undulating, had found the cool moist season highly favourable to meadow growth. The flats, however, had experienced a late season, very little spring growth having taken place even by the third week of November, when judging was done. Consequently very few entries were received from such areas.

The management of a meadow, though apparently simple, is not without its problems, and it will be appropriate to discuss here a few points which came under observation during judging.

Time of Closing.

The time at which to close a field, and save it for meadow hay is a matter not easy to decide. In 1931, for example, the season was such that fields closed early in the spring—during late August or early September, for example—turned out to better advantage than fields closed late, whereas the reverse was the case last year. What then is the best course to pursue? It would be an easy matter to decide if the season could be accurately forecast, but in the absence of this information, it is necessary to decide the matter on other considerations.

Early closing gives a longer growing season, and makes reasonably sure of a good yield. However, there is the possibility of rank growth occurring, and of a deterioration in quality due to lodging, rotting, and rust. As it is necessary to harvest such a field somewhat earlier than one closed late, it is believed also that a greater risk is incurred of experiencing bad weather at harvest time. The average rainfall during November and December over a period of 38 years is 322 and 310 points respectively, so that the difference in this respect is slight, though rather better drying conditions may be anticipated as the season advances. On the other hand a greater aftermath growth usually is obtained from a field cut early.

Late closing may be expected to result in lighter yields, but to increase the chances of better weather prevailing during haymaking, and of securing a stand of good quality. This was particularly the case last year. Owing to rank growth, lodging, and rotting taking place, there was a definite deterioration in quality in crops closed early, especially heavy crops. This was escaped by crops closed later in the season.

Fodder Conservation—Stacking grass hay at Yarram.

Another aspect of the matter, which affects both the time of closing and the time to make hay, is the nature of the plants composing the meadow, i.e., whether they are early or late maturing. Cocksfoot, for example, runs into ear very quickly, and late closing is desirable to hold it in check to some extent. Knotted clover again is later maturing than subterranean clover, and late closing is practicable if that plant is present in abundance. There is also a late variety of subterranean clover spreading voluntarily in some areas such as Nilma, which should again make late closing and late harvesting practicable.

Many farmers close early in case a dry spring should occur. No doubt they would reap an advantage in such an event, but Warragul is known to enjoy a very reliable rainfall, and a dry spring would be unusual.

From these considerations it is thought that, unless special circumstances prevail, later closing could be more generally adopted with advantage. Medium yields of good quality hay may reasonably be depended upon, and somewhat more favourable weather may be anticipated at harvest time. The wider use of late maturing plants is regarded also as worth consideration, though it must be stated that seed of such plants is not available commercially at the present time. Where such plants occur voluntarily in a field, however, and form the bulk of a hay crop, it should be worth while specially considering such fields for hay purposes.

On several farms it was noticed that a few hay stacks of previous years were still held in reserve. This is excellent husbandry, and a practice that should gradually extend in view of the developing interest amongst farmers in conserving meadow hay. With a few stacks on hand, they will not find it so necessary to close early, and look for high yields, but may follow a middle course, and aim at medium yields of good quality.

Time to Top-dress.

Another factor apparently influencing yield is the time of application of superphosphate. This varies from farm to farm, commencing with March, and ending in September. In a few cases, two applications are made during the year, in autumn and spring, and farmers so applying the manure express themselves as satisfied with the result, though the value of the spring application is not very certain.

This wide diversity in practice suggests not only that superphosphate applied at any time during the growing period gives a result, but also that the best time to apply it is not known. Only a small proportion of farmers topdress in spring, the remainder doing the work either in autumn or winter, without any special preference for one period or the other. Nor would it be easy to say from the competition results whether autumn or winter is better, though the writer ventures to say that late dressings in winter or early spring are less beneficial than earlier applications. The failure of several fields this season and last is considered to be due largely to this circumstance. In a few instances the same fields have been exhibited for the past three years, and while some have yielded well above the average each year, others have met with indifferent success. These latter, in a few conspicuous cases, have been topdressed once a year either late in winter or early in spring, and it would appear that their failure is largely attributable to this circumstance.

It is known from experiment that where soluble phosphates are available to certain plants in the seedling stage, a greater total response is obtained than when it is made available at a later stage, so that there seems good reason for believing, even in the absence of careful experimental results with pastures, that early autumn dressings, given when seedling

growth is taking place, are likely to be more beneficial than applications made later in the season. The recommendation is made, therefore, that phosphatic manures should be applied early in the season.

Competition Results.

Name.	Yield.	Nutritive Value or Quality.	Palatability.	Uniformity and General Appearance.	Freedom from Weeds.	Total.
Possible Points ..	**50**	**20**	**10**	**10**	**10**	**100**
Bingham, W. J. ..	46	20	10	9	10	95
Roberts, E. ..	44	20	10	9	9	92
Manley, G. ..	44	19	9	9	10	91
Ashcroft, W. H. ..	44	19	9	9	8	89
Pater, G. ..	44	18	8	9	9	88
McLaughlin, J. ..	44	18	8	9	8	87
Teese, R. S. (*a*) ..	42	18	8	10	9	87
Lennox, A. ..	40	19	9	9	10	87
Brazier, A. ..	40	19	9	9	9	86
Teese, A. G. ..	42	18	8	9	9	86
Smith, M. J. ..	42	18	8	9	8	85
Fish, A. M. ..	38	20	9	9	9	85
Jones, G. R. ..	38	19	9	9	9	84
Reed, W. J. ..	38	19	9	9	9	84
Stoll, H.	40	19	8	8	9	84
Tyssen, C... ..	36	20	9	9	9	83
Hamilton, J. ..	42	17	8	7	8	82
Hedley Bros. ..	38	18	8	9	9	82
Ryan, J. T. ..	38	18	8	9	9	82
Wachter, H. ..	38	18	8	9	8	81
Teese, R. S. (*b*) ..	38	18	8	7	8	79
White, T. (*b*) ..	38	18	8	7	8	79
Ricketts, A. E. ..	36	18	8	7	8	77
Sutherland, D. ..	36	18	8	7	8	77
Brooker, S. B. ..	35	18	8	8	8	77
Cuthbertson Bros. ..	34	19	9	7	8	77
White, T. (*a*) ..	36	18	8	7	8	77
Armour, J. McM. ..	34	18	8	7	8	75
Carr, W.	34	18	8	7	8	75
West Gippsland Hospital	34	18	8	7	8	75

Mr. W. J. Bingham, who secured first place with 95 points, exhibited a heavy field of very high quality. Sown down fifteen years ago to rye, cocksfoot, paspalum, and cow-grass, and topdressed regularly for a number of years, this field has developed into luxuriance, and now consists of nice proportions of grass and clover. Rye and cocksfoot are abundant, and paspalum probably is plentiful during summer. Kentucky blue has come in, together with a little fog-grass. The clovers consist mainly of subterranean, knotted, cluster, and suckling —all annuals, the red clover, as would be expected, having entirely disappeared after so many years. The field was very dense, and standing up well at the time of inspection, and promised a heavy yield of high quality hay.

Mr. E. Roberts secured second place with a fine exhibit which was ready to harvest at judging time. The field had been developed from natural pasture by regular topdressing over a period of eight years, during which period, Mr. Roberts stated, rye and clovers had come in and transformed the field. Rye, cocksfoot, and Kentucky blue were present in abundance, with subterranean clover forming a dense base. The manuring during 1932 had been unusual. About 6 to 7 cwt. of lime had been applied in March, and in July a dressing of 140 lb. of a fertilizer mixture consisting of two parts of superphosphate and one of sulphate of ammonia had been applied. Though the yield was apparently no heavier than many other fields, the proportion of grass was higher, and it was considered that hay of first quality should be obtained.

Mr. G. Manley, who secured third place with a splendid crop of cocksfoot and subterranean clover, exhibited a field entered in a previous year in the same competition. It was sown down four or five years ago, and, with the exception of 1931, has been cut each year for hay. Apart from the fact that the cocksfoot occurred in clumps, and gave the field a rather uneven appearance, it was a crop of its kind that would be difficult to improve upon. Topdressing has taken place regularly every autumn, and the field is grazed closely until closing time each spring—the first week in October.

A number of the remainder were of a high standard, consisting of good mixtures of grasses and clovers, reasonably free from weeds, and promising very good yields. Even the poorest crops were not without merit, a few being fields which had been topdressed for the first time last year with very satisfactory results.

The fields exhibited by Mr. J. Hamilton and Mr. A. G. Teese, were of unusual interest as the clover present was knotted clover, *Trifolium striatum*. It is not often that this plant is present in great abundance, but when it is, it appears to give a satisfactory crop—as heavy as that yielded by subterranean clover under the same conditions. It is rather later maturing than subterranean clover, or rather the ordinary commercial midseason type of subterranean clover, and so may be cut later in the season. It appears also to give satisfactory grazing as a pasture plant, though it has

A young and productive pasture for milking cows.

received no special notice in this connexion, and experience with it is not extensive. It should be worth while keeping under observation, however, and any special characteristics of the plant reported from time to time.

Cocksfoot Seed.

Messrs. Hedley Bros. brought under notice a harvest of cocksfoot seed made in January, 1932. A field of 2½ acres was sown down four years ago to Akaroa cocksfoot. A good stand developed, especially after a dressing of cow-yard manure, which was applied in the winter of 1931, and found very effective. The crop had been cut with reaper and binder on Boxing Day, and stooked. It was left for three weeks, and then threshed in the stook. Flailing was done on a sheet made of a dozen bags, which was moved from stook to stook as threshing was completed. The business end of the flail was made of twisted wire, which cut the ears, and threshed out the seed very well. Flailing occupied two men about a week between milkings.

The flailings were put through a ½-in. mesh, and then through a winnower with half the draught blocked up. A very fine sieve was afterwards used to remove clusters. This work was done on wet days, and at other odd times. Over 900 lb. of seed was obtained, worth, say, 9d. per lb., or a total of £33 15s.—a very satisfactory result.

PASTURE COMPETITION.

The pasture competition attracted several entries, and when more fully appreciated, this section should become equally as popular and attractive as the meadow competition. There are numbers of highly improved pastures in the district, which, with a little preparation, could reasonably be entered in a pasture competition. The preparation required is not very great, though to obtain the best results, it should commence early in the season. A question frequently asked is—"What preparation is necessary, and what condition should a pasture be in at judging time?" Every farmer knows that a pasture is at its best when it is clean, green, and succulent, and carrying a good bite. The sward should be healthy, uniform, and dense, with grasses and clovers in abundance, and herbs in small proportion. The time of judging —about mid-November—gives farmers the opportunity to show their pastures at their best.

Last season the spring was rather cold for the flats, where the pastures were backward, but on all hilly and undulating land, the swards were well advanced, and the best of them were in good order for judging.

Hints on preparing pastures.

Heaps of old dung lying about constitute one of the most obvious defects of a pasture.

Harrowing is an easy matter if done at the proper time, when rain has softened any hard dry manure, which is then broken up easily, and scattered about. Several kinds of harrows may be used for the job—diamond, chain, or the new Grassland harrows. Some farmers improvise an implement made of 3-in. x 4-in. quartering bolted at an angle to cross-pieces of heavier size. Others, again, make a drag-harrow with wire-netting stretched between two heavy pieces of timber. The type of implement does not matter if the job is well done, and a field is cleaned thoroughly before the spring starts. Some farmers harrow during spring also, but this tends to foul the grass, and a clean stand is not obtained until a good rain falls.

There is a good chance of a well harrowed field looking even and uniform, especially if harrowing has been an autumn as well as a winter practice. A uniform field, looking healthy and well-grassed, is very suitable for a pasture competition, and is in excellent condition for grazing.

Weeds are objectionable, especially creeping thistle, ferns, and blackberries, and it is sometimes necessary to use fern-hook and hoe throughout the year to keep a field clean. Some fields fail because of an abundance of rib-grass and dandelion, but there can be no objection to the presence of these in small proportions. It is considered, however, that some fields are so foul with rib-grass that they will need to be ploughed and cropped for a year or two, and sown down with reliable strains of rye-grass, cocksfoot and clover if first class pastures are to be obtained.

In some pastures also there is a super-abundance of clovers, and a relative absence of grasses. This condition is more pronounced in fields top-dressed for the first time or two, the grass content improving after a few years. But a more rapid improvement would be obtained by introducing rye and cocksfoot of the right type in the early stages of development.

A dense uniform field is obtained from a good grass and clover mixture by harrowing, top-dressing, and spelling between grazings. Top-dressing is preferably done in early autumn when phosphates are most required to encourage fresh growth, and seedling development. Spelling between grazings allows each plant in a pasture to recover from grazing, strengthen itself, and stool out. If these practices are observed, a steady improvement takes place, and an attractive pasture develops.

Though some reseeding is not only inevitable, but necessary in our pastures, it is undesirable that they should run to ear like a hay crop. For best grazing they should be kept leafy and green, and stemminess should be held in check as far as practicable. The practical evidence in support of this statement lies in the well known fact that the heavy milk yields of spring fall off when the pastures run to ear, although the bulk of feed is then greatest.

The Entries.

With the exception of a few pastures on flat land, the entries were located mainly on the characteristic red and chocolate soils of the district. The pasture type on these soils is fairly constant, consisting of subterranean clover with either rye or cocksfoot. There is usually a miscellany of minor grasses and clovers as well, such as hair-grass, goose-grass, suckling, cluster, and other annual clovers, together with herbs such as rib-grass and flat-weed.

On the flats the type is more variable over the district, though in each area of similar

A good fattening pasture.

country, it is commonly much the same. Rye-grass and fog are usually plentiful, with white clover as companion plant. Creeping bent and rough stalked meadow-grass occur in certain areas, and in others paspalum and lotus major. Annuals of various sorts usually are present, but seldom make any important contribution to the sward.

Several pastures were similar in type, and differed only in minor details, but others were individual and different, and, though there were only ten entries in the competition, the different types were of considerable interest.

Results.

Name.	Composition.	Denseness.	Management.	Uniformity and General Appearance.	Freedom from Weeds.	Total.
Ashcroft, W. H. ..	33	14	18	12	9	86
Teese, R. S.	32	11	22	11	9	85
McLaughlin, J. ..	30	14	20	12	8	84
Teese, L. (*a*) ..	30	14	18	11	9	82
Reed, W. J. ..	32	11	19	10	9	81
Ricketts, A. ..	32	13	17	10	8	80
Teese, L. (*b*)	32	11	18	10	9	80
Jamieson, — ..	32	10	20	9	9	80
Brooker, S. B. ..	29	10	19	8	9	75
Hardie, A. V.	29	10	17	8	8	72

In general, the exhibits were good, though few could be said to have been of a very high standard. Topdressing is understood and thoroughly appreciated in the district, as also are the benefits of harrowing, though to a less extent. The advantages of systematic grazing have not yet become a fact of experience with many farmers, but there is a general tendency to apply the principle as far as practicable. This involves extra expense for fencing, and may make necessary some reorganization of the farm. Farmers are wisely trying the practice on a small scale at present, but it is thought that the results so far obtained warrant an extension of the method.

The field exhibited by Mr. W. H. Ashcroft, which was awarded first place with 86 points, consisted of old pasture in very good heart. Though it had been grazed continuously, it had not been stocked heavily. Topdressing had been carried out in early spring. Rye and cocksfoot were abundant, with some fog and timothy present. Sub-clover also was abundant, and formed a dense sole to the sward. Rib-grass was present, but not to any great extent. Timothy is rarely plentiful in our Victorian pastures. In this particular instance, it had persisted well in small wet depressions in the field, and was to be found only in such areas.

The pasture carried abundant green feed, and looked well established and prolific. It has been used largely for fattening purposes for several years, and, as is often the case in such circumstances, soil fertility has increased, and a high-class pasture has developed.

Mr. R. S. Teese exhibited a pasture on flat land which was placed second with 85 points. Mr. Teese, as a result of his own experience, is a firm believer in topdressing. Regular applications have been made to this field for several years, and last year one bag of super. per acre had been applied in autumn, and 1 cwt. in spring. The field had been harrowed also, and weeds hoed out.

The land is moist, and carries Lotus major and paspalum in addition to rye, fog, and white clover. Owing to the rather wet and cold spring, the pasture was not far advanced and lacked denseness, but was clean and even, green and succulent. It was a piece of land put to its best use, well managed, and ready to grow abundant summer feed.

Mr. J. McLaughlin exhibited a nine-year-old pasture, which was placed third with 84 points. It has been topdressed with super. each year, and last year had received an application of that fertilizer in spring as well as in autumn. It had been harrowed frequently throughout the year, and the stock had grazed it more or less continuously. Rye-grass and subterranean clover formed the bulk of the pasture, with some cocksfoot, rib-grass, and a few annual grassses mixed through it.

The field presented an even appearance, the result no doubt of the frequent harrowing. There was a dense sole of grass and clover which was being uniformly grazed by the dairy herd. This pasture has reached a standard of which all the red soils of the district are capable. The means of attaining such a standard are worth noting—sowing down the right type of rye-grass, cocksfoot, and clover, regular annual topdressing, and two or three harrowings each year.

Mr. L. Teese exhibited much the same type of pasture, developed from native country by broadcasting sub-clover seed, and then topdressing annually over a period of ten years. Rye has come in, and cocksfoot also, but to a

[*Continued on page* 170.

Potato Growing in Victoria

No 2.—Seed Storage

By J. T. Ramsay, Potato Expert.

The first article of this series, which appeared in the March issue of the Journal, dealt with the condition and selection of seed.

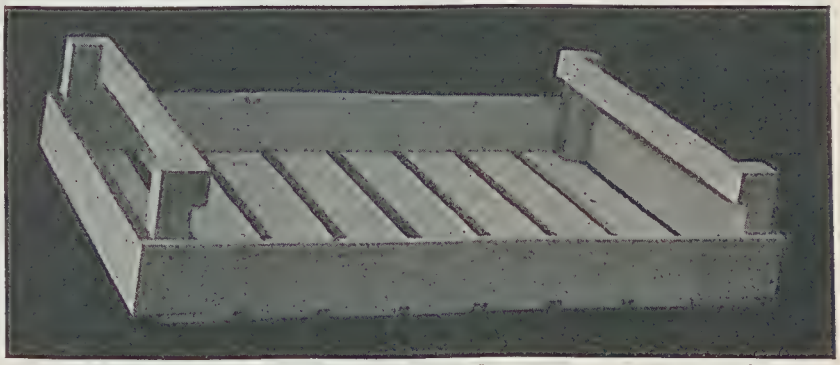
THE method adopted for carrying over, from harvest to the following planting, potatoes intended for seed is of the utmost importance since the success or failure of the crop depends largely on the treatment accorded the seed during that period.

So far as storage is concerned, potatoes can be divided into two classes:—(1) those intended for consumption, and (2) those intended for use as seed for the following crops. The correct storage treatments for these two purposes are entirely different. Ventilation is essential to the successful carrying out of both but, in addition to ventilation, potatoes intended for seed must have light as well, whereas potatoes intended for consumption must be kept from the light.

Light has a curious effect on potatoes. Solanum is developed, and the skin and flesh of the tubers turn green—the longer the exposure the deeper the green. This greening is effected to the very centre of the potato and is not confined merely to the surface layer of flesh. In this green condition the tubers are bitter to the taste and actually poisonous—in fact, stock have died through eating greened potatoes to which they have had accidental access.

Let us consider first the storage of potatoes intended for use as seed. It is essential that these be stored in such a way as will preserve them in sound condition during the period from harvest to next planting time, and the only way to do this is to subject them to a storage environment which will give them abundance of ventilation and ample light. This essential combination can be effected in several ways, some of which are:—(*a*) by storing them at very shallow depths, not more than two or three tubers deep, on racks or shelves in the open; (*b*) by placing them in similar manner inside a shed; and (*c*) by storing them in specially constructed seed potato boxes. Each of these methods produces the same condition, that is, the seed tubers are permitted the amount of ventilation, and the amount of light, requisite for their sound keeping. I want to stress the necessity for this ventilation and light during the storage period of seed potatoes because it is most important. Consider for a moment what happens when seed is subject to storage conditions under which it is denied a sufficiency of ventilation and light. Before many weeks, tubers so stored start to sprout because of the higher temperatures created by natural sweating, and maintained by lack of ventilation. Long before they are required for planting the tubers are overshot with long sprouts, which, because of lack of light, are white and intensely brittle. Such sprouts not only have a most exhausting effect on the parent tubers, but they are also incapable of withstanding without damage the handling incidental to planting. The effect of this is that the bulk of them are broken off, and devitalized seed results.

Seed correctly sprouted and greened.

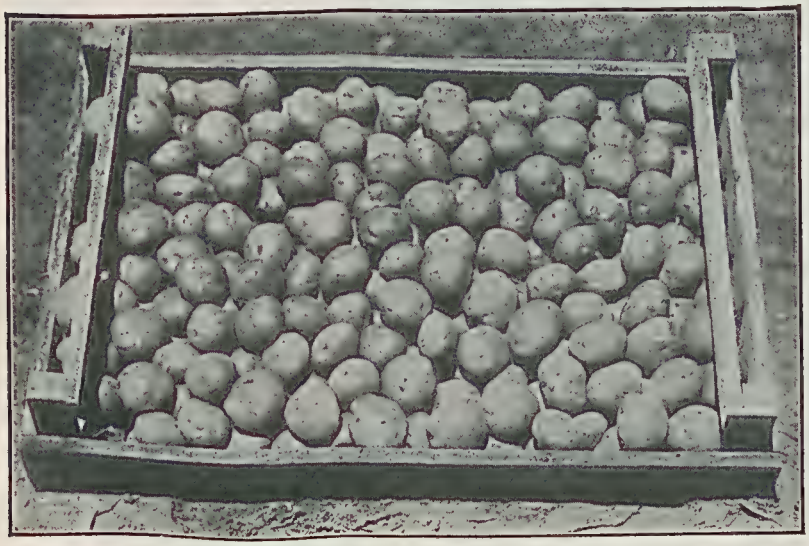


Seed Potato Box—Size 31 inches x 21 inches x 3 inch Sides.

A fairly common practice amongst growers who do not adopt correct storage methods is to break off all sprouts which may be growing from the tubers at the time of planting. This is a certain error. The object of such growers, of course, is to secure some uniformity in the appearance of the crop when it shows through the ground, but the seed suffers irreparably. When desprouting is practised the seed tubers are set back some weeks in their growth and are devitalized to the extent of the nourishment expended in producing the sacrificed shoots. It may be contended, of course, that the sprouts are sometimes too long at planting time to permit the seed to be handled without breaking them. If the seed has long shoots the owner's system of storage is very much at fault, and he should adopt proper storage methods.

Now, let us consider what happens when the seed is given ample ventilation and light. First, the ventilation has the curious effect of concentrating the flow of sap through the channel leading to the terminal bud so that, in the large majority of cases, only one sprout is developed, that of the main eye at the rose end of the potato. This concentration of the whole of the sap of the seed set towards feeding one sprout instead of half a dozen has the effect of giving a much stronger bud or sprout and, consequently, the plant gets a much better start in the season. In this connexion it should be noted that, for the first two or three weeks of its life in the ground, the young plant is totally dependent on the seed set for its nourishment, i.e., up to the time when the roots which develop at the base of the sprouts are capable of functioning and absorbing the plant foods contained in the soil.

The effect of light on the potato is to develop solanum during which process the skin and flesh of the tuber are turned green in colour. This "greening" process, as it is called, is highly beneficial, as it produces a flesh-hardened condition which enables the potato seed in storage to withstand the attack and arrest development of fungus, bacterial, and insect troubles. This, in itself, is of great importance from the purely economic point of view, since it reduces to a minimum loss during storage. The saving effected by the greening of seed has been estimated by growers at from 25 to 60 per cent. The action of light on the sprouts themselves is no less beneficial. Firstly, it suppresses the growth of the shoot and prevents it reaching an excessive length Secondly, it greens the



Boxed Seed in Ideal Condition for Planting.

sprout as it grows. This greening of the sprout has the effect of toughening it to such a degree that it is capable of standing fairly rough treatment without breaking—a very desirable feature. The importance of that point, i.e., the preservation of the first shoot, is considerable, as will be understood from the following.

If, when a potato sprouts, that sprout is broken off, in the majority of cases it will sprout again, but the second growth will be weaker than the first. Further, if desprouting is continued the time soon comes when the potato so treated is incapable of responding to the repeated demands on its progressively decreasing vitality. From this is may be easily understood how advisable it is to maintain the first sprouts undamaged and the vitality of the seed unimpaired. Mention has been made of various methods of storage that will produce the desired condition. Of those mentioned undoubtedly the most efficient and economical in the long run, is that of storage in seed-potato boxes. These boxes are now so well known that their description is unnecessary. They are procurable from any of the case-making firms in Victoria. Some reasons why the boxing system is preferable to others producing similar effects are:—(1) space is economized; (2) the seed may be inspected and moved with convenience; (3) the seed is more easily protected from frost and stock; and (4) less handling of the seed is entailed. When seed is stored in pits or heaps, the potatoes cannot be conveniently examined from time to time; the sprouting cannot be

Evidence of the Advantage of Boxing Seed. Note perfect condition of well-greened short buds on the left.

Potatoes with Shoots too far Advanced. Due to insufficiency of ventilation and light during storage period.

regulated, and the sprouted potatoes cannot be handled from the heaps or pits without injuring a large percentage of the shoots, thereby adversely affecting the sets. When seed is stored in boxes the sprouting can be regulated by the admission or the exclusion of light, and the tubers can be carted to the paddock and planted without damage to the sprouts.

If potatoes are stored in seed-boxes directly after digging, and therefore kept well ventilated, in the majority of cases only one shoot will grow from the terminal bud of each tuber; whereas, if stored in pits, or heaps, shoots will grow from almost every eye. The crop resulting from a potato planted whole, with only one eye sprouted, will give a heavier yield of marketable-sized tubers per acre than will a potato of similar size which has shoots at every eye. Seed sprouted nicely before planting will be ready for digging several weeks earlier than will unsprouted seed, and therefore the risk of attack by disease is decreased. When seed has sent forth a shoot prior to being placed in the ground, the grower can see clearly the vigour or weakness of each individual tuber, and can avoid planting sets which would produce weak plants.

In cases where large-sized potatoes are saved for seed, i.e., of a size too large to plant without cutting, it is advisable to green them first, either in boxes or otherwise. Then, in order to stimulate bud growth from more than one "eye," they should be covered to prevent ventilation until such time as the shoots are just showing. At this stage the covers should be removed, and the greening of the buds permitted without restriction. The reason for this special treatment of over-sized seed is that it is inadvisable at planting time to make more than one set from any tuber which has only one "eye" sprouted. If this be done there is the danger that the cut section or sections which have no sprout showing will be barren, with consequent misses in the crop.

An interesting illustration of the increased yield resulting from the proper storage of seed potatoes is furnished by the experience of a South Gippsland grower a few years ago. Portion of the seed saved from a crop of the "Up-to-date" variety was boxed, i.e., was stored in seed-potato boxes from May until December. Another portion of the seed from the same crop was stored from May to November in bags. In November, when the seed stored in bags was planted, it was found that all the tubers had sprouted from every eye. Those tubers which were considered too large to be planted whole were cut for the most part into two sections. In December the potatoes which had been stored in boxes were planted whole, as the majority of them sprouted only from the main eye. The manure used with each lot of seed was the same, viz., 2 cwt. superphosphate per acre. The soil in which they were planted was apparently of the same quality throughout, and the preparation and intercultivation given to both lots also were identical. Owing to the fact that the boxed seed was not cut, a greater weight per acre of these was planted. The rates of seeding per acre were—Boxed seed, 1 ton per acre; bagged seed, 16 cwt. per acre. Although the boxed seed was planted about one month later than the other, both lots matured at the same time, and when dug gave the following yields:—Boxed seed, 13 tons per acre; bagged seed, 8½ tons per acre. These were sold at £5 per ton on rails, and a simple calculation shows that the boxed seed returned fully £20 per acre more than that portion of the seed which was not boxed.

At the main potato experimental station conducted by the Department of Agriculture at Millbrook, on the Ballarat line, for the four years 1927-28 to 1930-31 inclusive, the average increase in favour of boxed seed as compared with seed stored in bags is not less than 2 tons 9 cwt. per acre, equal to 102 per cent. This surely is adequate proof of the higher efficiency of proper storage.

It may be mentioned here that, provided protection from frost be given—and this is required only in the portions of the State of higher altitudes—seed is best stored out in the open air.

The best proof of the economic soundness of any system is a practical demonstration of the enhanced profit accruing from its adoption.

The boxing of seed potatoes is continually advocated by this Department, and the results of experiments carried out in various parts of the State shows that the use of boxed seed results in substantially increased yields. The actual figures for these tests are—

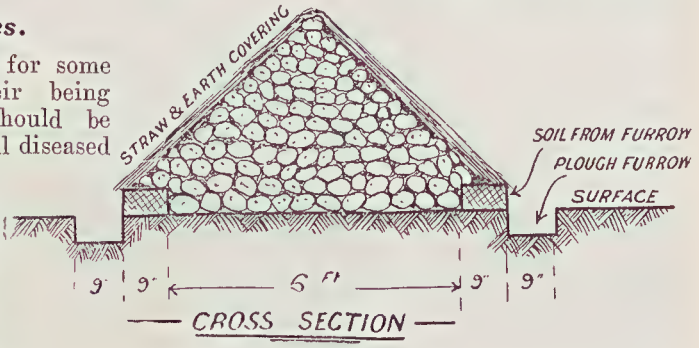
—	Average Seven Years. Tons.	Cwt.
Yield from boxed seed ..	6	9
Yield from bagged seed ..	3	10
Average increase ..	2	19

Percentage Increase, 84 Per Cent.

The yields shown above are for marketable size tubers only. In the experiments the treatment of the seed was the only variable factor, the soils, seasonal conditions, manurial treatment, and cultivation being the same.

Storage of Table Potatoes.

If it is desired to store potatoes for some time after digging prior to their being marketed for consumption, they should be pitted. Careful sorting to remove all diseased tubers should be done before placing them in the pits, and the site selected for their storage should have perfect drainage. A simple method of making a pit is to turn up by plough or spade two furrows parallel to each other with a space 6 to 8 feet between them (inside measurement), the empty furrow space, of course, being on the outside of the pit. These upturned sods form the sides of the pit and keep the potatoes up together; the ends may be made either circular or square. The narrower width of 6 feet is recommended for potatoes that are not lifted in the best condition, but where they are ripe, sound, and dry, the wider measurement of 8 feet is quite safe. The sides of the pile should be built up as steeply as possible, so that the covering of straw necessary for protection from light may be assisted in shedding off rain. Should there be any risk of damage by frost, a light coating of soil may be placed over the straw, leaving the ridge of the pit uncovered for the ventilation which is essential for successful storage. Earth storage, or pitting, is the only method recommended for potatoes intended for consumption, as no other method has been found which will retain flavour and condition to the same degree.



Potato Pit.

Warragul Meadow Competition 1932 (*continued from page* 165).

less extent. A pasture of this standard is readily and quickly obtainable by sowing down on the red and chocolate soils of the district, and is the one recommended for those areas where native grass and miscellaneous plants are still in possession—still too large a proportion of a highly productive district.

Mr. L. Teese exhibited also a young pasture established on land which two years ago was a bush paddock. The scrub had been cut and burnt, the land cleared, ploughed, and cultivated in spring, reploughed and worked to a fine tilth, and sown down in the autumn of last year. The following mixture was sown:

Perennial rye (Colac seed) ..	20 lb.
Cocksfoot (local seed) ..	10 lb.
White clover (N.Z. certified)	1½ lb.
White Dutch clover ..	1½ lb.
Sub-clover	1½ lb.
Alsike	1 lb.

Superphosphate was applied at the rate of one bag per acre.

An excellent clover strike which had resulted responded wonderfully to the top dressing. The rye-grass also had struck well, though somewhat irregularly, as usually happens on new country. The cocksfoot was in evidence as seedlings only, but should become more apparent the following year.

The field is an interesting example of the application of recent knowledge to the establishment of new pastures. In the past, the land sown down has not been rated as pasture land, but there seems to be a very good chance of success, and the outcome will be watched with interest.

It is hoped that the requirements of the competition will be more fully understood this coming season. There is no excuse for a small entry at Warragul, with its numerous instances of fine pastures. In the preparation of their pastures for the competition, farmers will learn and appreciate a great many points relating to plant life and the management of plants which hitherto have passed unnoticed.

The Bulk Handling of Wheat in Victoria

Committees' Reports

Following are the Reports submitted by the Committees appointed by the Hon. the Minister for Agriculture, J. Allan, M.L.A., to inquire into the Bulk Handling of Wheat in Victoria. They consist of—(1) Covering Report by Mr H. A. Mullett, B.Agr.Sc., Director of Agriculture; (2) A Joint Report by Messrs. H. A. Mullett and M. J. Canny, General Superintendent of Railway Transportation; (3) Report by Mr. F. W. Box, Acting Chief Engineer for Railway Construction, and (4) Report by J. A. Laing, M.C.E., Consulting Engineer.

1.—Covering Report by the Director of Agriculture

To the Hon. the Minister of Agriculture:

Pursuant to your instructions to epitomize the expert reports upon bulk-handling of wheat which were prepared in accordance with Cabinet's decision of 11th October, the following statement is submitted:—

Messrs. Mullett and Canny were directed to examine the wheat belt of Victoria and the production therefrom, and to determine the number and kind of wheat storages that would be required under a bulk-handling scheme, the localities at which they should be provided and the localities in which such installations would not be justifiable. The instructions also required that the Acting Chief Engineer for Railway Construction, Mr. F. W. Box, in association with an independent authority upon ferro-concrete construction should furnish a report as to the cost of constructing and equipping the storages determined upon. Mr. J. A. Laing, M.C.E., a leading consulting engineer practising in the city, and lecturer on civil engineering at the Melbourne University, was the expert engineer retained.

The objective of this investigation was for the purpose of providing data upon which a decision could be made as to the advisability or otherwise of adopting bulk-handling of wheat in this State. Although the present inquiry has been very complete, the scheme reported on should not be regarded as positively final in all its aspects. In such matters as location and capacity of country silos, relative to wheat deliveries, it may need revision in particular cases, but detail of this nature was regarded as more properly the function of the controlling body if and when constituted.

The reports to you may be epitomized as follow:—

1. *Scheme Submitted.*—Schemes providing for (1) 160 silos, and (2) 137 silos with various modifications of each, totalling six in all, were considered. Of these, scheme Ic is regarded as the most suitable.

Scheme 1c provides storages at 160 stations with a total capacity of 12,180,000 bushels, and terminal accommodation having a capacity of 2¾ million bushels at Williamstown, and 1½ million bushels at Geelong, i.e., a total of 4¼ million bushels. The places that would call for storages are named and the capacities of each indicated.

2. *Estimated Cost.*—The total capital cost of the scheme 1c is £2,005,000, made up as follows:—

160 country silos and terminals at Williamstown and Geelong	£1,766,480
Alterations to railway tracks, sidings, and rail approaches	35,000
Alterations to trucks ..	100,000
	£1,901,480
Interest during course of erection (three years) ..	103,533
Total capital cost ..	£2,005,013

3. *Probable Charges and Savings to Farmers.*—It was estimated that with this scheme it would be necessary to fix handling charges at 2d. a bushel for the country silos with an extra ½d. per bushel for that portion of the wheat passing through the terminals. Under bulk-handling, it was estimated, the net saving in the farmer's costs would amount to approximately 2¾d. per bushel.

4. *Estimated Use of Silos.*—On the assumption that 80 per cent. of the wheat now tributary to these stations ultimately would pass through the country silos, also at least a million bushels additional from farms conveniently situated at adjacent stations not provided with silos, it was estimated that an average of 23¾ million bushels would be dealt with in bulk in the country, and of that total it was estimated that 17 million bushels would be dealt with at the terminal elevators.

This would give an average of 1.95 fillings a year at the country silos and 4 fillings a year at the terminals. In the joint report of Messrs. Mullett and Canny, attention is drawn to the fact that any delay in reaching the 80 per cent. mark would be reflected to a greater or lesser extent in the financial results of the scheme.

5. *Availability of Services.*—This service would provide bulk-handling facilities for districts where, on the average, 87 per cent. of the State's wheat is produced and deal with 72 per cent. of the total, but the facilities would be available to receive 90 per cent. of all the wheat delivered to railway stations if producers avail themselves of the service.

Two hundred and seventy stations would not be provided with silos, but each of these receives on the average less than 30,000 bags per annum, and many of them are outside the wheat belt proper. The total amount received by these 270 stations does not aggregate more than 10 per cent. of the railway deliveries.

The question of providing direct loading facilities at some of these stations is raised and the cost given, but no recommendation has been made.

6. *Railway Considerations.*—The existing transportation service of the Victorian Railways would suffice to clear the silos of the capacities named as and when required, even in years of peak production, but in such years it is possible that, at certain stations in exceptional circumstances, it may be necessary to regulate farmers' deliveries or to make suitable alternative arrangements for the reception of any surplus wheat.

Other possible effects of bulk-handling on the Railways Department were not considered, but it is understood that it is the intention of the Railway Commissioners to furnish, to the Hon. the Minister of Railways, a statement as to the possible influence of bulk-handling on railway finances and on railway operations.

7. *Irregularity of Production.*—The financial aspect of irregularity of production has been investigated, station by station and year by year for the past ten years.

8. *Removable Silos.*—The scheme regarded as the most suitable for installation provides, in the case of eighteen stations, for the installation of silos in steel capable of being

removed and re-erected, and having a high recovery value. These districts are situated in the northern Mallee and in the proposed new irrigation area bounded by Picola, Katamatite, Shepparton, and the Murray River.

9. *Silos in the Riverina.*—Provision has been made for the installation of four silos at appropriate stations on border railways in the Riverina.

10. *Weighing Facilities.*—The provision of weighing-out facilities and accommodation for grading provided by Mr. Box in Scheme No. 1A is not recommended for adoption in full, but only in the case of 34 stations having a capacity of 3,650,000 bushels and an average output of 7,300,000 bushels (Scheme 1C). This quantity, together with that available in the terminals, is considered to be sufficient for local mill requirements, which are difficult to estimate exactly.

The design regarded as the most suitable is one that is adapted to the installation of the facilities if required in the future, and any designs not having this attribute are not advised.

The total saving on Scheme No. 1A if this recommendation is adopted is £66,248 in capital cost, and annual payments for sinking fund and interest would be reduced by £3,975.

11. *Consulting Engineer's Report.*—The consulting engineer closely investigated the schemes prepared by Mr. Box, and also the engineer's data relevant to the scheme propounded by the Victorian Wheat-growers' Corporation, as well as various modified schemes designed to reduce costs. Mr. Laing's report attached states that a very complete and adequately itemized bill of quantities and estimates has been prepared for a comprehensive scheme of bulk-handling. After close investigation he is of the opinion that every detail in connexion with the design and working of the system has received careful consideration, and that under any normal conditions the estimates of costs prepared by Mr. Box for Scheme 1A and 2A will not be exceeded.

He has also certified to the attached tabulation sheets giving the basic data from which the costs of the various modified schemes appended have been calculated.

With regard to the engineer's data submitted in connexion with the scheme of the Victorian Wheat-growers' Corporation, he states that, while this is not complete and requires the addition of substantial items to bring it into line with actual requirements, he regards the estimates submitted as confirming his view that the construction costs for Scheme IA can be carried out for the cost of the detailed estimate furnished for that scheme.

12. *Financial Considerations.*—Mr. Box has furnished estimates as to the prospective profitability of the various schemes. Money at 4½ per cent., repayable over 32 years, with 1½ per cent. sinking fund, is assumed; also 80 per cent. of wheat tributary to silo stations passing into the system. Working expenses and maintenance costs per bushel are taken as identical with those in New South Wales, viz., working expenses .7d., and maintenance .2d. per bushel.

Revenue is calculated at 2d. a bushel for wheat passing into country silos, and ½d. a bushel for wheat entering terminals; but no allowance is made for revenue for stored wheat.

On these bases the prospective profit for the scheme submitted is estimated as follows:—

Scheme 1C—

Total capital cost—£2,005,000

Estimated revenue	£233,334
Estimated expenditure, including interest and sinking fund ..	209,363
Prospective profit ..	£23,971

Business Analysis.—On the above calculation the scheme shows a prospective annual profit of £23,971. The figures were based on an average of 23¾ million bushels regularly passing through the country silos and 17,000,000 bushels handled by the terminals each year, but in fact the number of bushels that would be so handled would fluctuate with the season. In seasons of low production much less than that quantity would be handled, and, conversely, in peak years the quantity would be much greater than the average. In years of low production handling costs per bushel would be higher than the figure used in Mr. Box's calculation.

In order to survey the effect of fluctuating yields upon prospective profit or loss, costs of handling varying with the quantity handled were applied to the calculations. These were based upon the actual fluctuating operating costs incurred in New South Wales over the

past eight years. In this calculation it is assumed that 72 per cent. of the wheat actually received each year for railway delivery would pass into the system, and that 72 per cent. of the quantity actually exported would pass through the terminals, but it is probable that a higher percentage than this would pass through the terminals with correspondingly increased revenue. Additional revenue will be derived from wheat storage and other sources. In New South Wales £21,000 was received from these sources in 1930-31. In that State free storage is given to 31st July.

The attached schedule "A" shows the calculations in detail, and demonstrates Scheme 1c to be a profitable one on the assumptions adopted, i.e.—

(1) *Scheme* 1c.—160 silos adapted to future installation of weighing and grading facilities, and provided with those facilities in 34 cases sufficient to handle 7,300,000.

(2) Interest on capital at 4½ per cent.

(3) Sinking fund, 1½ per cent. (repayment period, 32 years).

(4) Eighty per cent. wheat at tributary stations passing into the system.

(5) Charges 2d. per bushel for country silos wheat, and ½d. per bushel for wheat *ex* terminal.

(6) £135,000 allowed for railway alterations and charges to the scheme.

(7) No allowance for any works the responsibility of the Melbourne or Geelong Harbour Trusts.

(8) Costs and estimates provided by the Acting Chief Engineer for Railway Construction and certified to by Mr. J. A. Laing, consulting engineer.

(9) No allowance has been made in the estimated profit given for revenue from stored wheat, &c. In New South Wales in 1931 this amounted to £21,000.

13. *Estimated Costs of Modified Schemes.*—Mr. Box and his staff have prepared very complete estimates for a comprehensive bulk-handling scheme (No. 1) for 160 country plants and (No. 2) for 137 picked stations, both with suitable terminal accommodation at Williamstown and Geelong. He also prepared and submitted a number of alternative designs and estimates of cost. In all schemes 5 per cent. has been allowed for contingencies. A summary of these estimates is given in schedule B.

(Signed) H. A. MULLETT,
Director of Agriculture.

20th February, 1933.

SCHEDULE "A."

Year.	72 Per Cent. of Rail Receivals.	72 Per Cent. of Exports.	Profit or Loss.	Interest on Deficit	Financial Position of Scheme.	Operating Costs.
	Bushels.	Bushels.	£	£	£	*d.*
1922–23	18,000,000	6,600,000	Loss 31,550	..	Dr. 31,550	1·0
1923–24	21,000,000	12,000,000	Profit 3,658	1,417	Dr. 27,892	·9
1924–25	33,300,000	22,900,000	Profit 78,778	1,255	Cr. 50,886	·9
1925–26	15,900,000	7,300,000	Loss 42,149	..	Cr. 8,737	1·05
1926–27	28,200,000	17,800,000	Profit 46,033	..	Cr. 54,770	·9
1927–28	14,400,000	3,800,000	Loss 58,384	..	Dr. 3,614	1·1
1928–29	24,600,000	17,400,000	Profit 28,537	163	Cr. 24,923	·9
1929–30	12,000,000	1,900,000	Loss 76,342	..	Dr. 51,419	1·2
1930–31	30,300,000	18,400,000	Profit 54,595	2,313	Cr. 3,176	·9
1931–32	34,500,000	20,100,000	Profit 79,700	..	Cr. 82,876	·9

SCHEDULE "B."

Summary of Estimates of Capital Costs of Various Schemes.

Scheme 1A—

160 silos fully equipped with binning and weighing-out facilities. Total capacity, 12,180,000 bushels; also terminals at Williamstown and Geelong—total capacity, 4¾ million bushels. Total cost	£1,831,270
Alteration to railway tracks, sidings, and road approaches	35,000
Alterations to trucks	100,000
	£1,966,270
Interest during construction, at 4½ per cent. (four years)	133,730
Total capital cost, ready for operation	£2,100,000
If construction period reduced to three years—	
Construction cost	£1,966,270
Interest	104,991
Total capital cost ready for operation	£2,071,261

Scheme 1B—

Scheme as for 1A, but without weighing-out facilities or special bin accommodation, and designed for its future installations and including railway costs as for 1A.	
Total inclusive cost of erection ...	£1,874,240
Interest (4½ per cent.) during course of erection (three years)	102,920
Total capital cost when ready for operation	£1,977,160

Scheme 1C—

Scheme as for 1A, but with the weighing facilities and special bin accommodation provided only at 34 stations; design of balance adaptable to its future installations. Railway costs as for 1A included.	
Total inclusive cost of erection ...	£1,901,480
Interest during course of erection (three years)	103,533
Total capital cost when ready for operation	£2,005,013

Scheme 1D—

160 stations as for 1A, but without weighing facilities or special bin accommodation; design unadaptable for its future installation. Railway costs as in 1A added.	
Total inclusive cost of erection (three years)	£1,714,560
Interest at 4½ per cent. during course of erection	99,102
Total capital cost when ready for operation	£1,813,662

Scheme 2A—

137 selected stations, fully equipped with special binning and with weighing facilities. Terminal elevators and railway costs as for 1A.	
Total construction cost	£1,848,040
Interest at 4½ per cent. during course of construction (three years) ...	102,330
Total capital cost when ready for operation	£1,950,370

Scheme 2B—

Scheme as for 2A, but without weighing out or special bin accommodation, but adapted to their installation later. Terminal capacity as for 1A, but with other facilities slightly reduced. Railway costs as for 1A.	
Total construction cost	£1,767,740
Interest during erection period (three years), at 4½ per cent.	100,524
Total capital cost when ready for operation	£1,868,264

2.—Joint Report by Messrs. H. A. Mullett and M. J. Canny

To the Hon. the Minister of Agriculture :

Pursuant to your instructions of 12th October to carry out Cabinet's decision of 11th October to examine the wheat belt of Victoria and the production therefrom, and to determine the number and kind of wheat storages that would be required under a bulk wheat handling scheme, the localities at which they should be provided and the localities in which such installations would not be justifiable, we desire to submit the following report. As knowledge of the capacities and kind of storages required at each locality was necessary to enable the engineers to proceed with their computations, this aspect was also investigated.

Basic Principles.

The nature of any scheme for bulk-handling of wheat in country districts (i.e., the number of districts served, the capacities of the silos relative to the wheat deliveries and their design and equipment), is largely governed by the necessity for the greatest possible economy in construction and operating costs compatible with efficiency. This is especially so because the scheme has to compete with, and make headway against, the firmly established bag system. Unless the farmer using the silos can make a reasonably substantial net saving in his wheat marketing costs, undoubtedly he will continue to adhere to the bag system, and, if so, the bulk scheme would prove a costly encumbrance to the State.

With bulk-handling the net saving in the farmer's costs amounts to approximately 2¾d. per bushel (that is with bags at 9s. dozen and wheat at 2s. 4d. bushel), and providing the cost of handling the wheat from country railway siding to the ship in bulk does not exceed the cost of that service with bags, the actual benefit to the farmer will be 2¾d. per bushel. In the engineer's report it is estimated that handling charges would be 2d. per bushel for wheat passing through the country silos with an extra ½d. per bushel for that portion of the wheat going through the terminals. This is approximately the same as the cost of handling bagged wheat.

To provide a scheme for Victoria that would compete with the bag system, the following basic data were adopted after consultation with the Acting Chief Engineer for Railway Construction, Mr. F. W. Box:—

(1) An average wheat delivery per station of approximately 90,000 bushels taken over the past ten years was accepted as the minimum quantity for which it is considered advisable to erect silos at stations.

(2) The provision in country districts of silos of a size that would enable them to be filled approximately on an average twice each year, the number of fillings being limited by the capacity of the railways to provide adequate transport facilities for clearing the overflow from the country silos as the wheat is brought in from the farms during the period of peak deliveries.

(3) The fixation of the minimum capacity for country silos at 50,000 bushels as the capital cost of storage space per bushel increases rapidly for the smaller installations.

Considerations of construction economy also made it necessary to restrict the number of sizes to as few as possible and, upon the engineer's recommendation, this was fixed at six.

(4) The six sizes chosen and their allocation to railway station deliveries are as follows:—

Storage Capacity	For stations where Deliveries range between :—
Bushels.	Bushels.
A. 50,000 ..	90,000—150,000
B. 80,000 ..	150,000—225,000
C. 110,000 ..	225,000—300,000
D. 150,000 ..	300,000—390,000
E. 200,000 ..	390,000—480,000
F. 250,000 ..	480,000 and over.

After consideration of the relevant data it was concluded that to ensure the success of the system, at least 80 per cent. of the wheat delivered to silo stations must pass through the silo system.

Any delay that may take place in reaching the 80 per cent. mark after the silos have been erected naturally would be reflected in the financial results of operation. The 80 per

cent. figure is regarded as attainable because it has now been realized with the New South Wales bulk-handling scheme. This scheme was undertaken primarily as a wheat storage measure during the war, and was followed by a long period of high prices for wheat and general prosperity for wheat-growers. For some considerable time farmers in that State were slow to adopt the bulk system, but the fall in the price of wheat in recent years greatly accelerated the swing over. Much quicker results, however, may well be expected in Victoria, because the conditions which forced the change in New South Wales are present in this State.

(5) *Statistical Data* (*See Appendix A1*).

Limitation of Silo Capacity in Country Districts.

The necessity to limit the capacity of the silos in the country to sizes that will ensure that they are filled more than once is found to be an economical requirement the world over. The average number of fillings of country silos in New South Wales is 1.4, although this figure is the average of a series of very irregular ratios.

The adoption of this principle places the railway system under the necessity of clearing the country silos to make provision for incoming wheat.

During the past ten years the deliveries of wheat to the railways averaged approximately 33,500,000 bushels per annum out of a total average annual yield of approximately 40,000,000 bushels, and the figure adopted for the Victorian scheme, after close examination of all the relevant data, works out at actually 1.95 fillings in an average year. In a peak year, such as 1931-32, when about 48,000,000 bushels of wheat were transported by rail, this ratio would be increased, and the Railways Department would be required to shift the equivalent of about 3,000,000 bushels of wheat weekly, including bagged wheat, for eight weeks. This may be compared with the average transportation service actually given in 1931-32 under the bag system when about 2,000,000 bushels were trucked weekly for a period of eleven weeks.

With the bag system there is no business necessity to immediately truck away a large proportion of the wheat as received from the farmers' wagons, and on the average, approximately 50 per cent. of the total received is stacked at country stations. For this reason, from a transportation point of view, an economic bulk-handling system is less elastic than the bag system, because the country silo capacity is definitely limited, and any surplus must be transported immediately to the terminals or to local consumers. However, exhaustive examination of the data available has satisfied us that, if a bulk-handling system with the number, capacity, location, and design of silos recommended in Mr. F. W. Box's report be adopted, in a year of average production, the extra truck service needed for both bag and bulk requirements is well within the existing capacity of the railways, and that, in a peak year such as 1931-32, when approximately 48,000,000 bushels were despatched by rail, it would still be within the capacity of the existing railway facilities to adequately cater for the traffic.

The instructions received did not require of us, in a joint capacity, full consideration of any other possible effect (including financial effect) of such a system of bulk-handling upon the Railways Department; consequently no further reference will be made here to this aspect beyond mentioning that the Railways Commissioners will furnish the Honorable the Minister of Railways with a statement as to the influence of bulk-handling upon their Department from both the operating and the financial point of view.

Analysis of Wheat Receivals at Country Stations.

Wheat-growing in Victoria is confined mainly to the Wimmera, the Mallee, and the northern districts—over 87 per cent. of the State's total wheat production being grown in these three provinces; but to a relatively minor extent wheat is produced in other districts as shown on map "A."

In all, there are 430 railway stations receiving wheat, of which 270 each deal with on the average less than 90,000 bushels per annum. At these latter stations, many of which are outside the wheat belt proper, the quantity received is insufficient to justify permanent silo accommodation.

An analysis of railway statistics of wheat receivals at country stations over the past ten years shows the following grouping:—

52 stations receive less than 15,000 bushels per annum.

91 stations receive between 15,000 and 30,000 bushels per annum.

41 stations receive between 30,000 and 45,000 bushels per annum.

78 stations receive between 60,000 and 105,000 bushels per annum.

137 stations receive more than 105,000 bushels per annum.

At 160 of these stations an average of approximately 90,000 bushels or over is delivered per annum, and these are regarded as each receiving sufficient wheat for the installation of silos.

Irregularity of Production.

The production of wheat at these centres, however, is by no means regular each year. In fact, it is subject to very considerable fluctuation, most marked in the northern Mallee districts, but occurring also in all districts. The irregularities are such that, although in a proportion of cases heavy crops in one district off-set light crops in another, the cumulative effect produces considerable variation in the total yield from year to year.

Table Showing Yearly Fluctuations in Railway Receivals of Wheat in Victoria.

Year.	Railways Receivals (Bushels per Annum).
1922-23 ..	25,743,496
1923-24 ..	31,076,979
1924-25 ..	47,774,046
1925-26 ..	22,580,343
1926-27 ..	40,127,358
1927-28 ..	20,723,916
1928-29 ..	39,696,616
1929-30 ..	17,039,517
1930-31 ..	43,667,025
1931-32 ..	47,859,100
Average 10 years ..	33,628,396

The average quantity of wheat received at country stations over this period was, therefore, in round figures, 33,500,000, the lowest being 17,039,517 bushels in 1929-30, and the highest 47,859,100 bushels in 1931-32. This latter quantity was exceeded only once, i.e., in 1915-16, when, under abnormal conditions—a patriotic endeavour to increase food production impinging upon high prices for wheat, a very favorable season and an abnormal acreage available following a severe drought—a record crop of 58,521,700 bushels (Government Statist) was grown. This yield was the product of the coincidence of so many abnormal factors that it has been discarded in these calculations, the upper limit of the quantities considered being the railway receivals for 1931-32. The country silos would be refilled a maximum number of times during such a season, and the railways would be working at high pressure for about eight weeks.

Viewing the figures for deliveries in such a year, and having regard to the storage capacity available in the silos, and the railway rolling-stock position, on the average there would be no blockage in the system.

The production of wheat in individual centres also varies widely from year to year, the most marked variation occurring in the northern Mallee where, at some stations in two or three of the last ten years, little or no wheat was delivered. Ouyen may be selected as a fairly typical instance of the fluctuations in the Mallee district, and may be contrasted thus with Kiata, where there is a much more regular sequence.

	Annual Wheat Receivals. At Ouyen. (bags).	At Kiata (bags).
1922-23 ..	21,154 ..	53,035
1923-24 ..	37,106 ..	30,667
1924-25 ..	32,411 ..	83,288
1925-26 ..	13,426 ..	46,202
1926-27 ..	44,447 ..	40,110
1927-28 ..	13,358 ..	32,732
1928-29 ..	28,092 ..	29,636
1929-30 less than	3,000 ..	25,365
1930-31 ..	71,418 ..	47,436
1931-32 ..	75,888 ..	56,921

The presence of occasional peak years of abnormally high production as in 1931-32 at Ouyen, is typical of many centres, though perhaps not quite of the same relative order. Such years cannot be specially provided for, however, and while it has been shown that the railway transportation system can handle peak surpluses, taking the State as a whole, so far as individual local abnormalities are concerned, transportation facilities at times may be inadequate to keep particular silos clear. Hence, in such years, it may be necessary for short periods, to regulate the rate of delivery from farms to the local station in those individual instances, or to make suitable temporary arrangements for the reception of the wheat.

Allocation of Capacity to Country Districts.

The number of silos and their capacities can be fixed, and, in the majority of instances, final allocation can be made to stations, but, in certain border-line propositions and special cases, finality may be arrived at only by detailed examination of local conditions on

the spot. This we consider would properly be the function of the responsible silo authority if and when constituted. The allocation herewith, however, is regarded as sufficiently exact for the purpose for which this report is required.

Calculations furnished by Mr. Box demonstrated that, at present construction costs, it would be uneconomic to install silos at more than 160 stations, and accepting an average annual delivery of about 90,000 bushels as the minimum for which storage would be provided, an analysis of the figures for wheat deliveries to the railways over the last ten years enabled us to make the following allocations:—

TYPES OF SILO ACCOMMODATION TO BE PROVIDED.

Number of Stations.	Capacity (Bushels).	Total Capacity (Bushels).
73	50,000	3,650,000
53	80,000	4,240,000
24	110,000	2,640,000
8	150,000	1,200,000
1	200,000	200,000
1	250,000	250,000
160	Grand total capacity at country stations	12,180,000

In an average year the amount of wheat (railway deliveries) tributary to these 160 stations is 28,500,000 bushels. If and when 80 per cent. of this total is delivered by farmers in bulk, the country silos would deal with approximately 22,750,000 bushels. This quantity may be augumented to an indeterminate extent by the transference of wheat from farms situated in territory contiguous to adjacent non-silo stations, but so located that, without incurring more than, say, a mile or so of extra cartage, wheat could be delivered at a silo station. An approximate estimate of the amount of wheat that may be so transferred is 1,000,000 bushels. Therefore, it is regarded as likely that 23,750,000 bushels would pass through the country silos in an average year. This represents 72 per cent. of the State's total average crop handled by the railways, but if all wheat-growers at stations provided with silos availed themselves of the facilities, 29,500,000 bushels could be handled, i.e., 90 per cent. of the wheat delivered to Victorian railway stations.

Riverina.—Provision has been made for country silo accommodation in the wheat-growing areas served by the border railways in the Riverina. Wheat from these lines passes into Victoria, and is either consumed locally or is exported from Williamstown.

From a railway transportation point of view, this area is regarded as portion of Victoria, and since it is considered that in respect of bulk-handling it should be similarly equipped, the construction of silos at the following stations in the Riverina is proposed:—

Deniliquin,
Sangar,
Warragoon,
Rennie.

A list of the 160 stations which for the purposes of this report have been allocated silos, with the capacity set down for each, is appended. (*See* Appendix A).

ANALYSIS OF THE ALLOCATION AS TO BUSINESS ASPECT OF CERTAIN LOCALITIES CHOSEN.

A business analysis of the relevant figures was made for each of the 160 stations allocated silos, and for some 30 others that appeared to be worthy of consideration. The allocation had been made upon average figures for the whole system. The object was to examine the actual position in respect of each station for each of the past ten years, in order to determine the incidence of fluctuating yields (especially low yields arising from drought) upon the profitability of particular silos. Capital charges were assumed to be:—Interest 4½ per cent., and sinking fund 1½ per cent., while working costs were taken at .7d. per bushel in the country, and .2d. per bushel at the terminals, i.e., the same as in New South Wales.

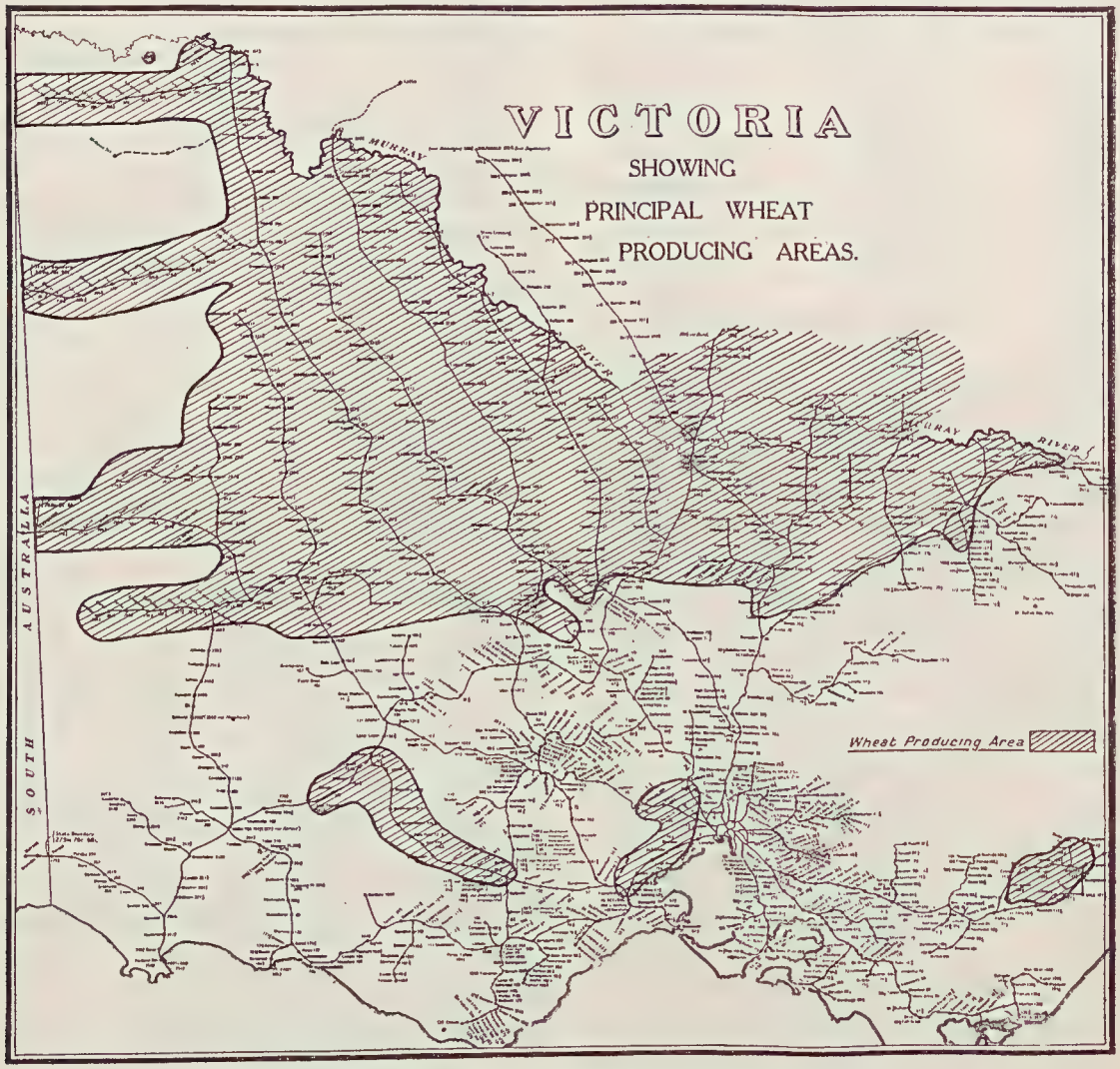
The construction costs submitted by Mr. Box for scheme 1A were accepted. It was further assumed that 80 per cent. of tributary wheat would pass through the silos, but no provision was made for any losses that might be incurred before that percentage was reached. Terminal costs were distributed proportionately between the country silos on a capacity basis. In this analysis 115 silos showed a profit and 45 a loss over the ten years' period, but the loss on the latter was more than offset by the profit on the former. The 45 stations showing a loss are set out in Appendix B.

The figures obtained from this analysis furnish a basis for the elimination of marginal propositions in the event of its being necessary to do so for any reason, but the allocation which has been made will, we consider, give a well-balanced distribution in the principal wheat-growing centres.

The accompanying maps (A and B) show respectively the wheat belt of Victoria and the stations proposed to be served with silos and those not so served. The capacity of each silo is also indicated.

Provision for Silos Capable of Being Removed and Re-erected Elsewhere.

In certain of the northern Mallee districts wheat-growing is a comparatively recent development, and is by no means stabilized. In these cases the records afford insufficient evidence as to the average productive capacity of the districts, as years of total failure have been frequent, although the true rate of frequency is by no means clear. The price of wheat and the Government policy in regard to land settlement will, no doubt, determine whether wheat-growing will stabilize itself in those districts. If a bulk-handling scheme be adopted it would, we feel, be desirable to equip certain stations in such districts with silos, since it would assist struggling farmers to make ends meet, but, for the reasons mentioned, the erection of silos of concrete construction is not warranted at the present juncture. Accordingly, Mr. Box was asked to prepare estimates for a series of types of silos in steel designed to permit of removal, and providing for as high a recovery value as possible.



Map A.—Victoria, showing principal wheat-producing area.

This type is considered suitable for installation at eighteen stations, including several stations in the proposed irrigation area which the State Rivers and Water Supply Commission has surveyed for the ultimate use of portion of the water *ex* Hume Weir. That area is bounded by Picola on the west, Katamatite on the east, Shepparton on the south, and the Murray River on the north.

Provision for Direct Loading at Certain Stations Not Provided with Silos.

The scheme submitted provides for the erection of silos at 160 country centres. This would leave a balance of 270 wheat-receiving stations without bulk-handling service. In many of these districts wheat is not of major importance as a cash crop, but a number of the stations are situated within the wheat belt proper, and in the future it may be desirable to provide facilities that would enable farmers to load in bulk direct into trucks if they so desired. To meet this contingency, Mr. Box has furnished plans and estimates of costs of suitable structures fitted with portable elevators in units of 3,600 bushels and 7,200 bushels capacity respectively, and with alternative designs in timber, steel, and pre-cast concrete. The costs are shown in the schedule to Mr. Box's report.

As the scheme previously mooted did not contemplate providing facilities for bulk wheat, except in the orthodox steel or concrete structures, we concluded that we were not required to make any recommendation upon this aspect.

Provision at Country Silos of Facilities for Weighing Outgoing Wheat and for Future Grading.

In scheme No. 1A, Mr. Box has made provision at each country silo for facilities for weighing outgoing wheat and also special bin accommodation to permit of grading if that system of marketing is later adopted; also to permit of separate handling of any lots requiring it from time to time irrespective of grading.

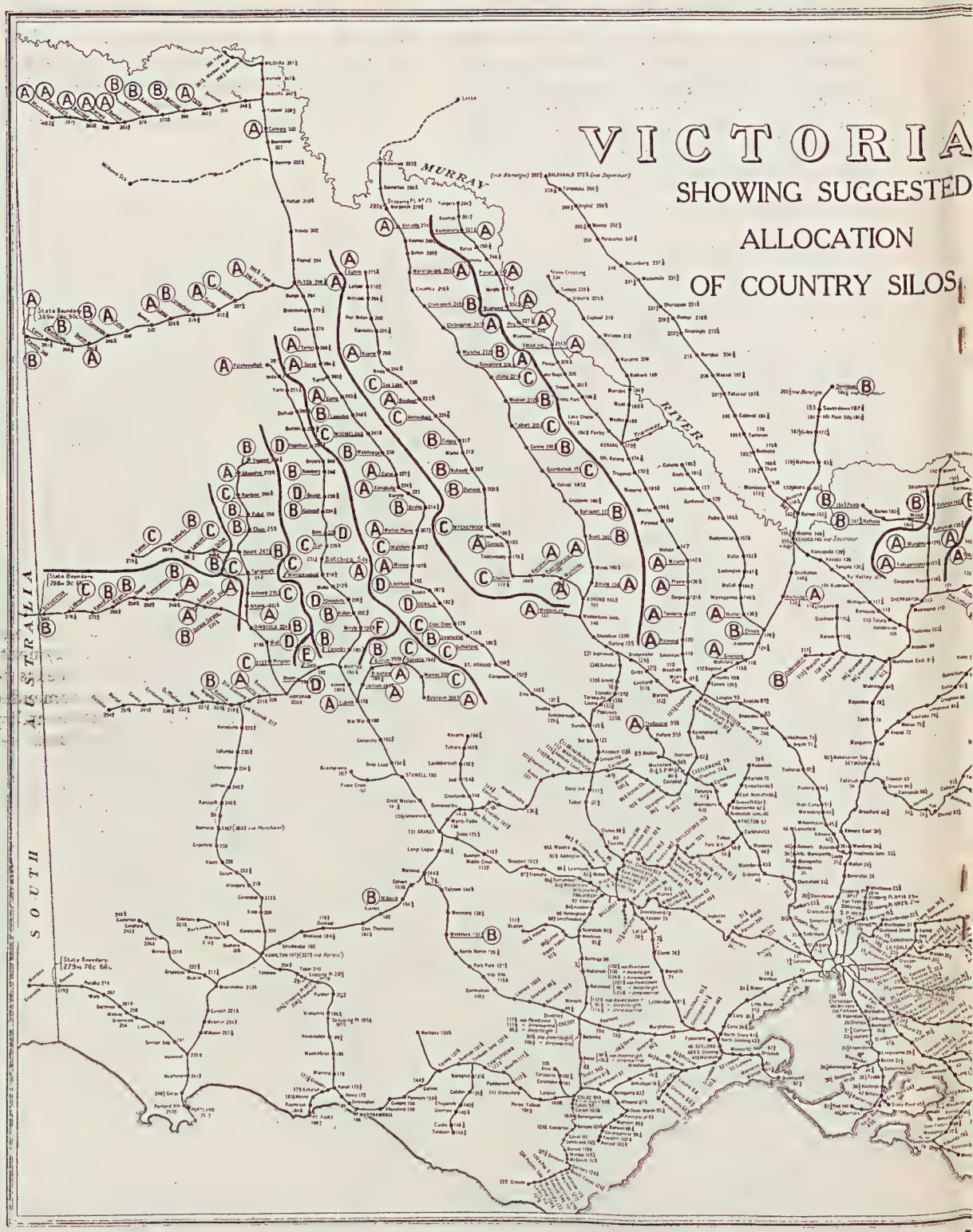
Local weighbridge receipts are accepted as ingoing weights, and the provision of weighing-out facilities is for the purpose of checking weights of wheat despatched from the silos into the railway system on its way to the terminal where it would be re-weighed or to local mills. These provisions are embodied in the New South Wales scheme, where there is provision for grading (although at fifteen stations in that State weighing facilities are not provided), and are usual in North America, where grading is universal.

After careful study of the matter, however, we are not satisfied that it has been demonstrated that provision at this stage of these special facilities to every silo is warranted. Grading is likely to be adopted eventually, because the world trend is in the direction of buying wheat, the quality of which is defined with precision, and wheat-breeders in Australia who are now seriously attacking the problem of breeding high strength wheats should succeed in producing commercially successful varieties, but it may be ten years and probably longer before grading becomes a commercial requirement here. In the meantime the scheme would have to bear interest and sinking fund on the installation.

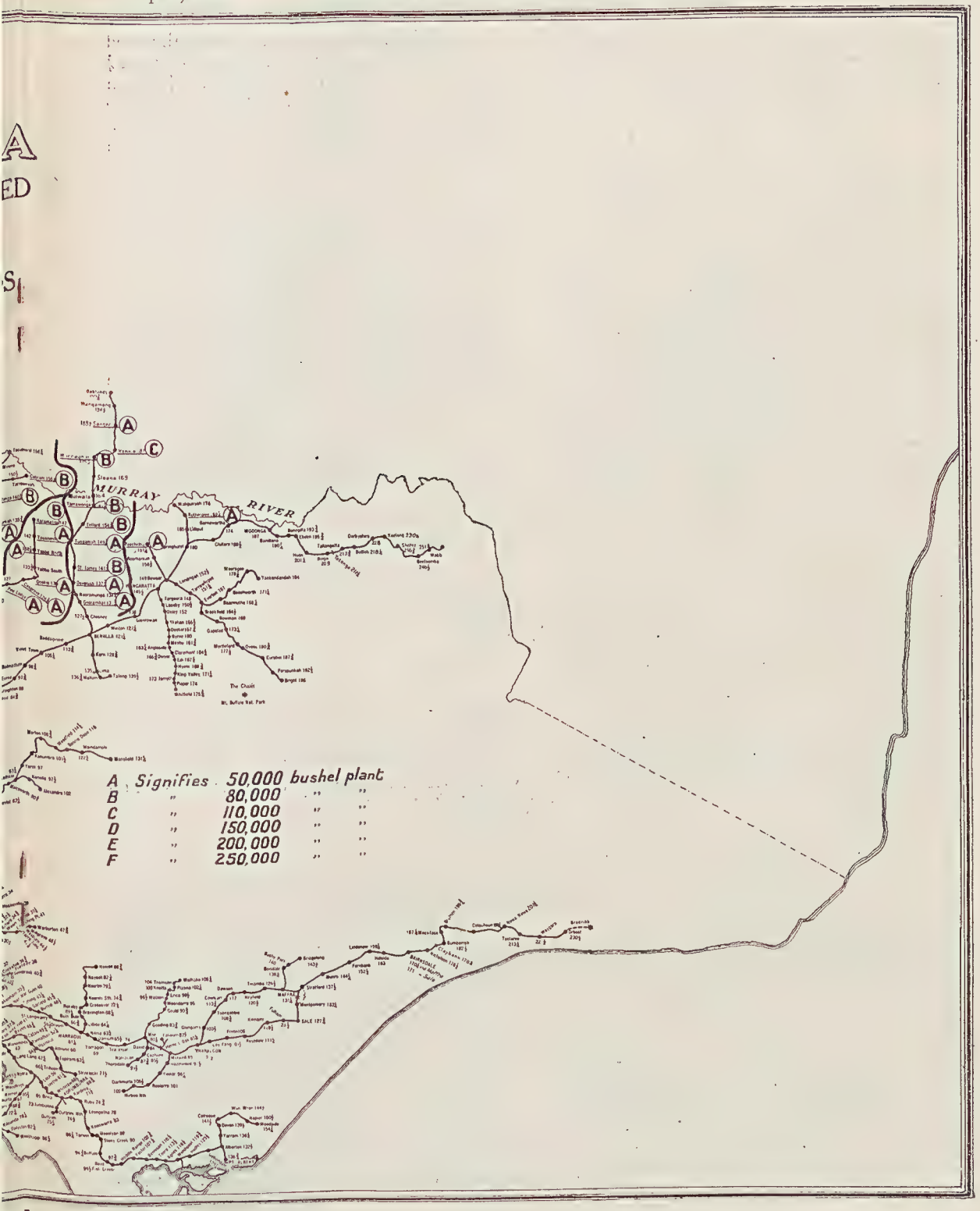
So long as sufficient weighing-out facilities are provided to weigh the wheat bought by local flour mills, and the design adopted permits readily of the provision of the additional facilities if and when required, the proposed scheme is considered adequate for present needs.

The existing trade custom with bagged wheat is to accept weighbridge weights of mill employees as the weights upon which payments are made to sellers. This system appears to work successfully, but cannot be recommended for adoption by a public or semi-public utility holding wheat in trust for others and responsible to them for any shortages.

At the present time it is not possible to gauge accurately to what extent local flour mills will avail themselves of bulk wheat. Their total requirements (including those for flour for export trade) fluctuate, and up to 17,000,000 bushels have been gristed by them in one year. A considerable portion of this is bought direct in the country, and may never pass through the silos. On the whole, it is considered that if for the present a total country silo capacity of 3,650,000 bushels, i.e., approximately 7,300,000 total outward flow, were fitted with weighing facilities for use for mill consignments, this together with the accommodation in the terminals would suffice for a considerable time. Accordingly, we have concluded that all silos of 80,000 bushels capacity and lower, namely, 126, should be constructed to provide for, but need not at the outset be fitted with weighing and grading facilities, and that the 34 above that capacity



Map B.—Showing suggested



ted allocation of country silos.

should be fitted, or any like re-arrangement within the capacity allotted more suitable to mill requirements and to locality. If this be done an immediate saving of £66,248 would be made upon the cost of Mr. Box's scheme No. 1A.

Terminal Capacity, Relation to Ports of Shipment, Railway Deliveries, and Export Trade.

In collaboration with Mr. Box, consideration was given to the following sites:—Portland, Williamstown, and Geelong. With regard to Portland, it is considered that the reasons given for the non-selection of Portland in the report of the Parliamentary Board which inquired into the bulk-handling of wheat in 1925, apply with equal force to-day.

It is estimated that, allowing for the requirements of metropolitan mills, on an average 17,000,000 bushels from the stations to which silos have been allotted will be exported in bulk, and terminal provision sufficient to deal with this quantity is assumed at 4,500,000 bushels. It is considered, however, that this terminal capacity will be sufficient for the handling of any quantity that may be offered in bulk up to that received in the year 1931-32, provided there is an uninterrupted movement of the wheat through the terminals to waiting ships. In the event of there being an insufficiency of ships, either the rate of bulk receivals in the country would have to be reduced, or, alternatively, temporary storage space provided, and like methods would have to be taken if farmers or exporters unduly deferred marketing the wheat.

The terminal capacity has been allocated between Williamstown and Geelong at 2¾ million and 1½ million respectively. Such an allocation is tentative, but is sufficient for the purposes of this report, as costs will not be increased by any re-allocation of storage between those ports. Although Geelong has in recent years grown in favour as a shipping port, mainly because of the 1s. 3d. per ton freight rebate allowed on wheat shipped thereat, regard also has been paid to the fact that—

(1) The larger vessels from Geelong have to top up at Williamstown.

(2) Wheat is delivered from tributary territory over a shorter period to Williamstown than to Geelong.

In determining the total capacity of the terminals, regard has been paid to the availability of export shipping over the past five years and the rate of shipment during that period. Wheat will be shipped out of the terminals at a faster rate than under the present system, but sufficient charters must necessarily be regularly arranged.

It is understood that in Sydney there has been a steady flow of shipping, and that there has consequently not been any trouble in keeping the terminals clear from the shipping aspect.

(Signed) H. A. MULLETT,
Director of Agriculture.

(Signed) M. J. CANNY,*
General Superintendent of Railway Transportation.

* Concurred in so far as the railway transportation aspect of the report is concerned.

APPENDIX "A."

"A" Silos—Capacity 50,000 Bushels.

Goornong, Rochester, Shelbourne, Massey, Morton Plains, Kinnabulla, Curyo, Gama Speed, Tempy, Ouyen, Carwarp, Galah, Torrita, Linga, Tutye, Danyo, Carina, Pirlta, Bambill, Yarrara, Merringur, Karween, Moraklla, Wychitella, Buckrabanyule, Barrakee, Glenloth, Boigbeat, Nyarrin, Kulwin, Wedderburn, Borung, Gowanford, Chillingollah, Manangatang, Annuello, Raywood, Tandarra, Prairie, Mitiamo, Swan Hill, Pira, Nyah West, Piangil, Kooloonong, Hunter, Lubeck, Kiata, Salisbury, Nhill, Jackson, Rupanyup, Bolangum, Batchica, Patchewollock, Vectis, Arkona, Albacutya, Tallygaroopna, Wunghnu, Numurkah, Pine Lodge, Cosgrove, Dookie, Yabba North, Youanmite, Goorambat, Devenish, Tungamah, Sangar, Peechelba, Rutherglen.

"B" Silos—Capacity 80,000 Bushels.

Elmore, Deniliquin, Swanwater, Birchip, Watchupga, Lascelles, Underbool, Cowangie, Murrayville, Panitya, Merrinee, Karrawinna, Werrimull, Dumosa, Nullawil, Culgoa, Boort, Barraport, Cannie, Meatian, Waitchie, Chinkapook, Dimboola, Gerang Gerung, Tarranginnie, Miram, Kaniva, Servicceton, Westmere, Willaura, Burrum, Picola, Coromby, Nullan, Galaquil, Roseberry, Natimuk, Jeparit, Ellam, Pullut, Yaapeet, Detpa, Netherby, Katunga, Colbinabbin, Katamatite, Nathalia, Waaia, Cobram, St. James, Telford, Yarrawonga, Warragoon.

"C" Silos—Capacity 110,000 Bushels.

Sutherland, Cope Cope, Watchem, Woomelang, Walpeup, Charlton, Wycheproof, Berriwillock, Sea Lake, Quambatook, Lalbert, Ultima, Pimpinio. Lillimur, Marnoo, Warracknabeal, Lah, Antwerp, Tarranyurk, Rainbow, Lorquon, Yanac, Rennie, Banyena.

"D" Silos—Capacity 150,000 Bushels.

Donald, Litchfield, Dooen, Wail, Sheep Hills, Brim, Beulah, Hopetoun.

"E" Silos—Capacity 200,000 Bushels.

Jung.

"F" Silos—Capacity 250,000 Bushels.

Minyip.

APPENDIX "B."

Stations at which a Loss on Operations was Shown.

"A" Silos—Capacity 50,000 Bushels.

Goornong, Morton Plains, Gama, Ouyen, Carwarp, Galah, Torrita, Linga, Tutye, Danyo, Pirlta, Bambill, Yarrara, Merringur, Buckrabanyule, Boigbeat, Kulwin, Borung, Raywood, Prairie, Mitiamo, Swan Hill, Nyah West, Piangil, Kooloonong, Hunter, Salisbury, Nhill, Rupanyup, Mellis, Annuello, Batchica, Dookie, Yabba North, Youanmite, Peechelba, Rutherglen.

"B" Silos—Capacity 80,000 Bushels.

Merrinee, Karrawinna, Werrimull, Waitchie, Chinkapook, Willaura, Cobram.

"C" Silos—Capacity 110,000 Bushels.

Lalbert.

APPENDIX "A. 1."

Statistical Data.

Three sets of statistics were available:—

(*a*) Governmental statistical figures for total production.

(*b*) Quantity of wheat transported by the railways in each financial year.

(*c*) Receivals of wheat at country stations in each crop year.

After full consideration the figures for railway receivals furnished by the Railway Department were adopted as the basis for the calculation in respect of the relation of allocation of silo capacity to country districts. The statistics for total production include wheat gristed at country mills, also that retained on farms for any purpose (including seed, stock feed, &c.), and hence include more wheat than the quantity likely to be subject of the proposed scheme.

The figures for railway truckings are for financial years, and include carry-over from previous crops and reconsigned wheat.

3.—*Engineer's Report*

(*Abridged.*)

To the Hon. the Minister of Agriculture:

In accordance with Cabinet instructions of 11th October, estimates of the cost of construction of each type of silo, with the plant and equipment necessary for operation, have been made, based on detailed plans and present day costs.

Consideration has been given to alternative designs with a view to the determination of the most economical type and form of country silos and terminal elevators, suitable for satisfactory operation of a bulk handling scheme for the State, and in this connexion recent developments in design in New South Wales and Canadian elevator construction have been carefully investigated.

In districts where wheat-growing may not be regarded as being permanently established or where, owing to possibility of future development of irrigation, wheat-growing may eventually be curtailed, structures more readily removable and with some recovery value are desirable, and with this end in view the costs of steel plants, designed with the view of possible removal to other locations, have been prepared.

These steel plants would be furnished with less bin facilities than would be provided in the reinforced concrete structures, but should provide satisfactory service.

Estimates have been prepared according to Drawing No. 30B/3332 for silos without working houses at country stations, and have been included in the appended analysis. Although this type of country silo might possibly suffice for existing bulk conditions, I do not recommend its adoption in connexion with a bulk handling scheme suitable for future requirements.

At some of the wheat receiving stations, where the receivals are insufficient to justify the construction of a permanent structure, it is desirable to provide facilities for loading in bulk, and with this objective elevated bins with gravity discharge have been designed and estimated.

Diagrams of type installations and summarized costs of each type of installation are appended:—

(1) Estimates for terminal elevators at Williamstown and Geelong.
(2) Estimates for each type of country silo.
(3) Estimates for elevated bins.

In addition to the cost of construction of country silos, and terminal elevators at Williamstown and Geelong, expenditure will be incurred in alterations to railway tracks, sidings, and road approaches, together with truck alterations.

SCHEME (1).

Silo provision at 160 of the principal wheat-receiving stations aggregating 12,180,000 bushels capacity, and terminal elevators at Williamstown (2¾ million bushels capacity) and Geelong (1½ million bushels capacity).

Estimated Costs.

Scheme 1A.—160 Stations Fully Equipped with Binning and Weighing Facilities.

Country silos at 160 stations ..	£1,079,410
Terminal elevator at Williamstown	432,960
Terminal elevator at Geelong ..	318,900
	£1,831,270
Alterations to tracks, sidings, and road approaches	35,000
Alterations to trucks	100,000
	£1,966,270
Interest during construction (3 years, 4½ per cent.)	104,991
Total capital cost ..	£2,071,261

Scheme 1B.—Exclusive of Weighing out Facilities or Special Bin Accommodation at Country Silos, but Design Adaptable for their Future Installation.

Country silos at 160 stations ..	£997,380
Terminal elevator at Williamstown	427,960
Terminal elevator at Geelong ..	313,900
	£1,739,240
Alterations to tracks, sidings, and road approaches	35,000
Alterations to trucks	100,000
Carried forward	£1,874,240
Brought forward	£1,874,240
Interest during construction (3 years)	102,920
Total capital cost ..	£1,977,160

Scheme 1C.—Weighing Facilities and Special Bin Accommodation Provided at 34 Stations Only; Design of Balance Adaptable to Future Installation of these Facilities.

Country silos at 160 stations ..	£1,014,620
Terminal elevator at Williamstown	432,960
Terminal elevator at Geelong ..	318,900
	£1,766,480
Alterations to tracks, sidings, and road approaches	35,000
Alterations to trucks	100,000
	£1,901,480
Interest during construction (3 years)	103,533
Total capital cost ..	£2,005,013

Scheme 1D.—Without Weighing Facilities or Special Bin Accommodation and Design Unadaptable for their Future Installation.

Country silos at 160 stations ..	£827,700
Terminal elevator at Williamstown	432,960
Terminal elevator at Geelong ..	318,900
	£1,579,560
Alterations to tracks, sidings, and road approaches	35,000
Alterations to trucks	100,000
	£1,714,560
Interest during construction (3 years)	99,102
	£1,813,662

Attention is directed to the fact that where Scheme 1c provides for facilities for installing shipping bins and weighing hoppers at some future date when required in the silos of 50,000 bushels and 80,000 bushels capacity, immediate installation of those facilities is provided for in the installations of greater capacities and the

operation of the plants at minimum cost, Scheme 1D neither provides nor is adaptable for such provision, and, further, will entail additional operation costs.

It will be necessary to employ an extra hand at silos of Scheme 1D to effect the simultaneous operations of receiving from farmers' wagons and loading into railway trucks—they are essentially storage silos.

These extra operating costs will amount to at least one-tenth of a penny per bushel, or approximately £10,000 per annum.

SCHEME (2).

Silo provision at 137 of the principal wheat-receiving stations aggregating 11,030,000 bushels capacity, and terminal elevators at Williamstown (2¾ million bushels capacity) and Geelong (1½ million bushels capacity).

Estimated Costs.

SCHEME 2A.—FULLY EQUIPPED WITH BINNING AND WEIGHING FACILITIES.

Country silos at 137 stations ..	£964,180
Terminal elevator at Williamstown	432,960
Terminal elevator at Geelong ..	318,900
	£1,716,040
Alterations to tracks, sidings, and road approaches	32,000
Alterations to trucks	100,000
	£1,848,040
Interest during construction (3 years)	102,330
Total capital cost ..	£1,950,370

SCHEME 2B.—EXCLUSIVE OF WEIGHING OUT FACILITIES OR SPECIAL BIN ACCOMMODATION AT COUNTRY SILOS.

Country silos at 137 stations ..	£893,880
Terminal elevator at Williamstown	427,960
Terminal elevator at Geelong ..	313,900
	£1,635,740
Alterations to tracks, sidings, and road approaches	32,000
Alterations to trucks	100,000
	£1,767,740
Interest during construction (3 years)	100,524
Total capital cost ..	£1,868,264

Financial Prospects of the Bulk Handling Scheme.

It is assumed that money will be available for construction purposes at 4½ per cent. and 1½ per cent. sinking fund (repayment of the principal in 32 years).

With complete installation at 160 country stations, and terminals at Williamstown and Geelong, it is estimated that in an average year, based on 80 per cent. of the deliveries at those country stations being dealt with in bulk—

- 23¾ million bushels will be dealt with in bulk at the country silos; and
- 17 million bushels will be dealt with in bulk at the terminal elevators.

With complete installation at 137 country stations, and terminals at Williamstown and Geelong, it is estimated that in an average year, based on 80 per cent. of the deliveries at those country stations being dealt with in bulk—

- 22 million bushels will be dealt with in bulk at country silos; and
- 16 million bushels will be dealt with in bulk at terminal elevators.

SCHEME 1A.—The estimated capital expenditure was £1,966,270, and allowing for interest during course of construction the total capital cost may be increased to approximately £2,100,000.

Estimated Annual Expenditure.

Six per cent. on £2,100,000 ..	£126,000
Working expenses and maintenance on 23¾ million bushels at .9d. per bushel	89,063
	£215,063

Estimated Prospective Revenue.

Country silos—23¾ million bushels at 2d. per bushel	£197,917
Terminal silos—17 million bushels at ½d. per bushel	35,417
	£233,334

Showing a prospective annual profit of £18,271, exclusive of revenue from storage.

SCHEME 2A.—The estimated capital expenditure was £1,848,040, and allowing for interest during course of construction the total capital cost may be increased to approximately £1,950,000.

Estimated Annual Expenditure.

Six per cent. on £1,950,000 ..	£117,000
Working expenses and maintenance on 22 million bushels at .9d. per bushel	82,500
	£199,500

Estimated Prospective Revenue.

Country silos—22 million bushels at 2d. per bushel	£183,333
Terminal silos—16 million bushels at ½d. per bushel	33,333
	£216,666

Showing a prospective annual profit of £17,166 exclusive of revenue from storage.

Owing to lower capital costs the financial prospects of schemes No. 1B, No. 1C, No. 1D, and No. 2B are likely to be slightly more favorable.

Consideration has been given to a scheme wherein the plants of 50,000 bushel capacity would be constructed according to plan No. 30B/3332, i.e., no special bins or weighing hopper would be provided nor would they have provision for future incorporation; in the remaining 87 plants of higher capacity, such facilities would be provided, and they would be of design according to plan No. 30B/3333, except in the case of the 80,000 bushel plant.

The 80,000 bushel design would be a two-bin plant with special bin and weighing hopper.

The estimated cost of the scheme is:—

73 Plants (50,000 bushels capacity), £4,030 ..	£294,190
53 Plants (80,000 bushels capacity), at £6,800 ..	360,400
24 Plants (110,000 bushels capacity), at £8,890 ..	213,360
8 Plants (150,000 bushels capacity), at £11,000 ..	88,000
Carried forward, 158 plants ..	£955,950
Brought forward, 158 plants ..	£955,950
1 Plant (200,000 bushels capacity), at £15,500 ..	15,500
1 Plant (250,000 bushels capacity), at £18,400 ..	18,400
160 Stations	£989,850
Williamstown terminal elevator	427,960
Geelong terminal elevator	313,900
	£1,731,710
Truck alterations ..	100,000
Alterations to tracks, sidings, and road approaches	35,000
	£1,866,710
With a 3-year construction programme, the interest during course of construction	83,290
	£1,950,000

Financial Prospect of Scheme.

Six per cent. on £1,950,000 (4½ per cent. interest and 1½ per cent. sinking fund)	£117,000
Working expenses and maintenance on 23¾ million bushels at .9d. per bushel	89,063
	£206,063
Prospective annual revenue on handling	233,334
Prospective annual profit ..	£27,269

In the year 1930-31 the New South Wales scheme handled slightly less quantities than shown above, and although free storage was given to 31st July, it received the sum of £21,000 from storage and charges, other than direct handling charges.

F. W. BOX,

Acting Chief Engineer for Railway Construction.

4.—Consulting Engineer's Report

To the Hon. the Minister of Agriculture :

In pursuance of instructions received from Mr. H. A. Mullett, Director of Agriculture, I have examined the data and estimates prepared by Mr. F. W. Box, M.C.E., Acting Chief Engineer for Railway Construction, in connexion with the proposal for the bulk-handling of wheat in Victoria.

I find that a very complete and adequately itemised bill of quantities and estimates has been prepared for a comprehensive scheme for bulk handling, both for country installations and terminal installations at Williamstown and Geelong. Similar quantities and estimates have also been prepared for a number of alternative proposals of a modified nature for country and terminal installations.

After a close investigation I am of opinion that each detail in connexion with the design and working of the system has received careful consideration, and I am satisfied that under any normal conditions the capital cost of installing plants as specified hereunder at 160 country stations and terminal plants as specified hereunder at Williamstown and Geelong will not exceed £1,831,270. While for an alternative scheme of 137 country plants, as specified hereunder and terminal plants as before will not exceed a capital cost of £1,716,040.

Scheme 1 (160 Country Plants).

73 Plants of 50,000 bushels capacity as per dg. 30B/3349.

53 Plants of 80,000 bushels capacity as per dg. 30B/3349.

24 Plants of 110,000 bushels capacity as per dg. 30B/3349.

8 Plants of 150,000 bushels capacity as per dg. 30B/3349.

1 Plant of 200,000 bushels capacity as per dg. 30B/3349.

1 Plant of 250,000 bushels capacity as per dg. 30B/3349.

Williamstown terminal of storage capacity 2,322,000 bushels and working-house capacity of 430,000 bushels.

Geelong terminal of storage capacity 1,191,600 bushels and working-house capacity of 310,000 bushels.

Both terminal plants to be fully equipped with track sheds and shipping galleries.

Scheme 2 (137 Country Plants).

To be as for Scheme 1 except that 23 country plants of 50,000 bushels are excluded.

I have also examined estimates of various modified schemes and I am satisfied that the estimates set out for these in the tabulation sheets initialed by me are substantially correct.

In accordance with instructions I have also examined the engineers's data relevant to the scheme propounded by the Victorian Wheat Corporation.

While this scheme is not complete and requires the addition of substantial items to bring it into line with actual requirements, I regard the estimates given as confirming my view that a bulk-handling installation as set out in Scheme A above can be carried out at a capital cost of £1,831,270.

I have also analysed the construction cost of the 80,000 bushel plant (2 bin) provided with shipping bin and weighing hopper as submitted by Mr. F. W. Box, and I am of the opinion that the estimated cost, viz., £6,800, is a fair and reasonable one. The actual estimate has been initialed by me 16th December, 1932.

I desire to state that Mr. Box has given me every assistance in my work, and that I am also indebted to Mr. Mullett for explaining at length matters in connexion with this report.

Yours faithfully,

JOHN A. LAING, M.C.E.

Consulting Engineer, Chancery House, 440 Little Collins-street, Melbourne, 13th December, 1932.

Estimates of Cost for Country and Terminal Elevator Installations.

TERMINAL ELEVATORS AT WILLIAMSTOWN AND GEELONG.

ALTERNATIVE PROPOSALS.

Date of Estimate: 9th December, 1932.

—	Williams-town.	Geelong.	Williams-town.	Geelong.	Williams-town.	Geelong.	Williams-town.	Geelong.
Capacity (bushels)—								
Storage bins ..	2,322,000	1,191,600	2,008,100	2,008,100	2,008,100	2,084,200	2,322,000	2,084,200
Working house ..	430,000	310,000	430,000	430,000	430,000	310,000	430,000	310,000
Total ..	2,752,000	1,501,600	2,438,100	2,438,100	2,438,100	2,394,200	2,752,000	2,394,200
Combined capacity (bushels) ..	4,253,600		4,876,200		4,832,300		5,146,200	
Reference Diagram Drawing No. ..	30B/3348	30B/3356	30B/3357	30B/3357	30B/3357	30B/3358	30B/3348	30B/3358
Amount	£432,960	£318,900	£418,980	£390,830	£418,980	£366,740	£432,960	£366,740
Total for alternative proposals ..	£751,800		£809,810		£785,720		£799,700	

NOTE.—With minimum equipment, the total cost of each alternative proposal would be reduced by £10,000.

COUNTRY SILO CONSTRUCTION.

SUMMARY OF ESTIMATED CONSTRUCTION COSTS FOR ALTERNATIVE PROPOSALS.

50,000–250,000 *Bushel Plants.*

Date of Estimate: 9th December, 1932.

Capacity of Plant. (Bushels.)	Concrete Plants.						Steel Plants.			
	With Shipping Bins, Weighing Hopper, and Modified Working House. Drawing No. 30B/3349.		Omitting Shipping Bins and Weighing Hopper and with Provision for Future Modified Working House. Drawing No. 30B/3333.		Without Working House Drawing No. 30B/3332.		With Partial Working House. Drawing No. 30B/3340.		Without Working House. Drawing No. 30B/3340.	
	Total Cost.	Cost per Bushel.	Total Cost.	Cost per Bushel.	Total Cost.	Cost per Bushel.	Total Cost.	Cost per Bushel.	Total Cost.	Cost per Bushel.
	£	*d.*	£	*d.*	£	*d.*	£	*d.*	£	*d.*
50,000	5,010	24·05	4,500	21·60	4,030	19·34	5,630	27·02	4,750	22·80
80,000 (2 bin) ..	6,800*	..	..	..	..	..	..	..	..	..
80,000 (4 bin) ..	7,140	21·42	6,620	19·86	5,450	16·35	6,930	20·77	6,010	18·03
110,000	8,890	19·40	8,370	18·26	6,240	13·61	..	..	..	..
150,000	11,000	17·60	10,480	16·77	7,700	12·32	..	..	..	..
200,000	15,500	18·60	15,200	18·24	..	..	..	..	..	..
250,000	18,400	17·66	18,100	17·37	..	..	..	..	..	..

* Reference Diagram Drawing No. 30B/3354.

COUNTRY SILO CONSTRUCTION.

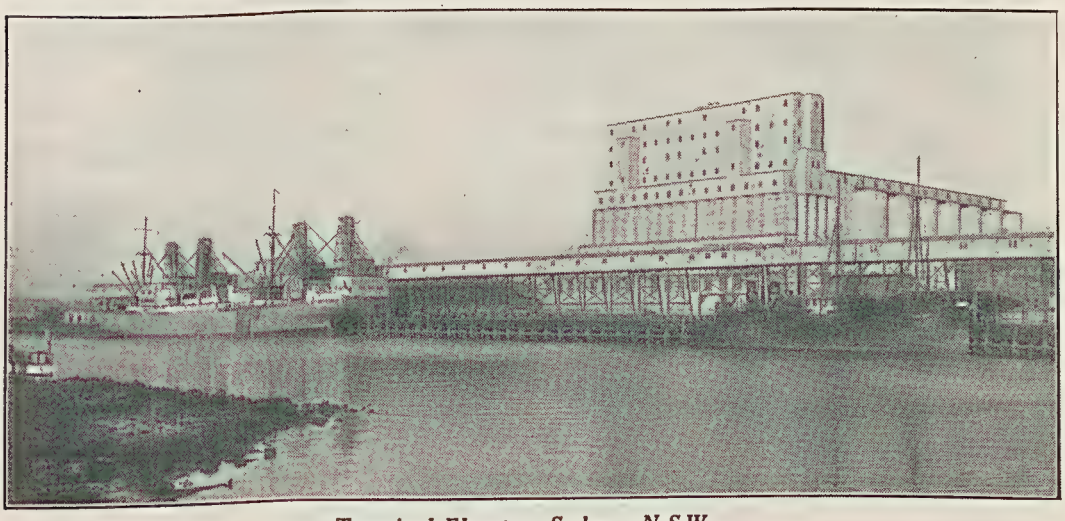
Temporary Plants.

3,600–7,200 Bushels Capacity.

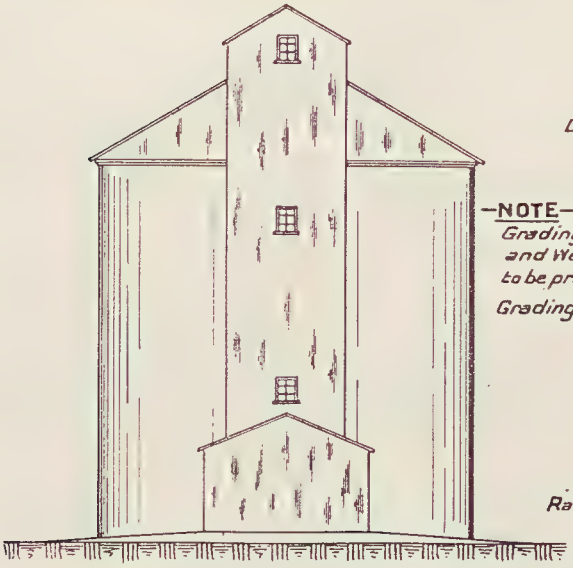
Description.	Estimated Cost (inclusive of £220 for Portable Elevator).	
	Capacity in Bushels.	
	3,600	7,200
	£	£
Timber construction—		
(*a*) Timber posts	..	680
(*b*) Unserviceable rail posts	560	740
Steel construction—		
(Unserviceable rail posts)	910	1,540
Pre-cast concrete construction—		
(Unserviceable rail posts)	770	1,310

(Sgd.) F. W. BOX,
Acting Chief Engineer for Railway Construction.
12th December, 1932.

Checked,
(Sgd.) J. A. LAING.
12th December, 1932.

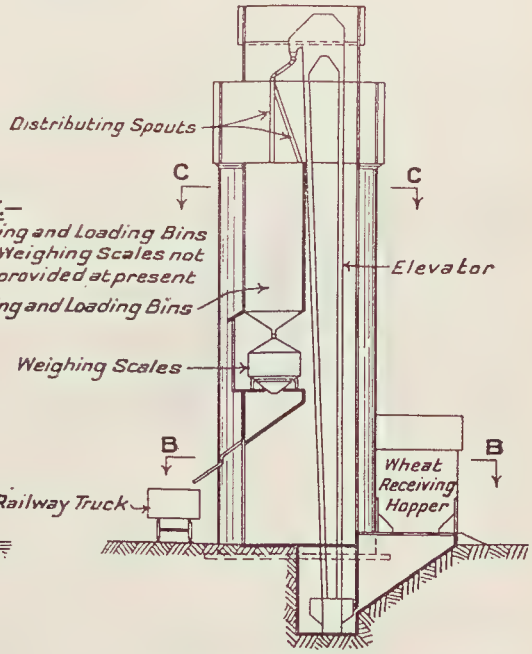


Terminal Elevator, Sydney, N.S.W.

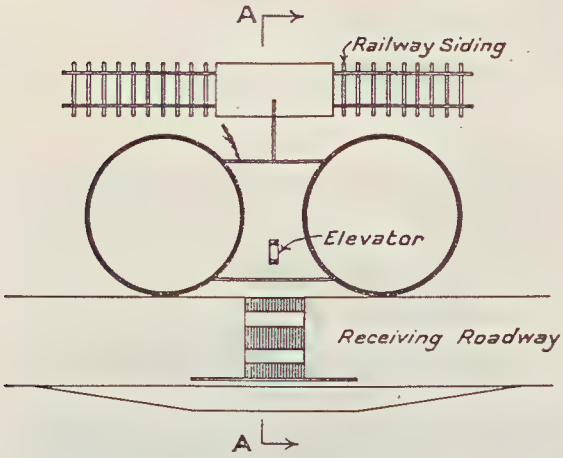


—NOTE—
Grading and Loading Bins and Weighing Scales not to be provided at present

—ELEVATION—



—SECTION A-A—



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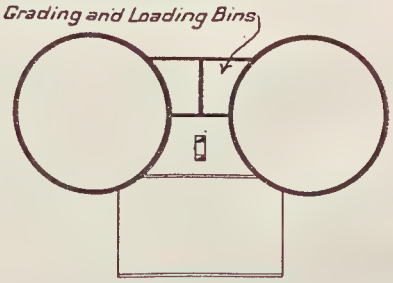
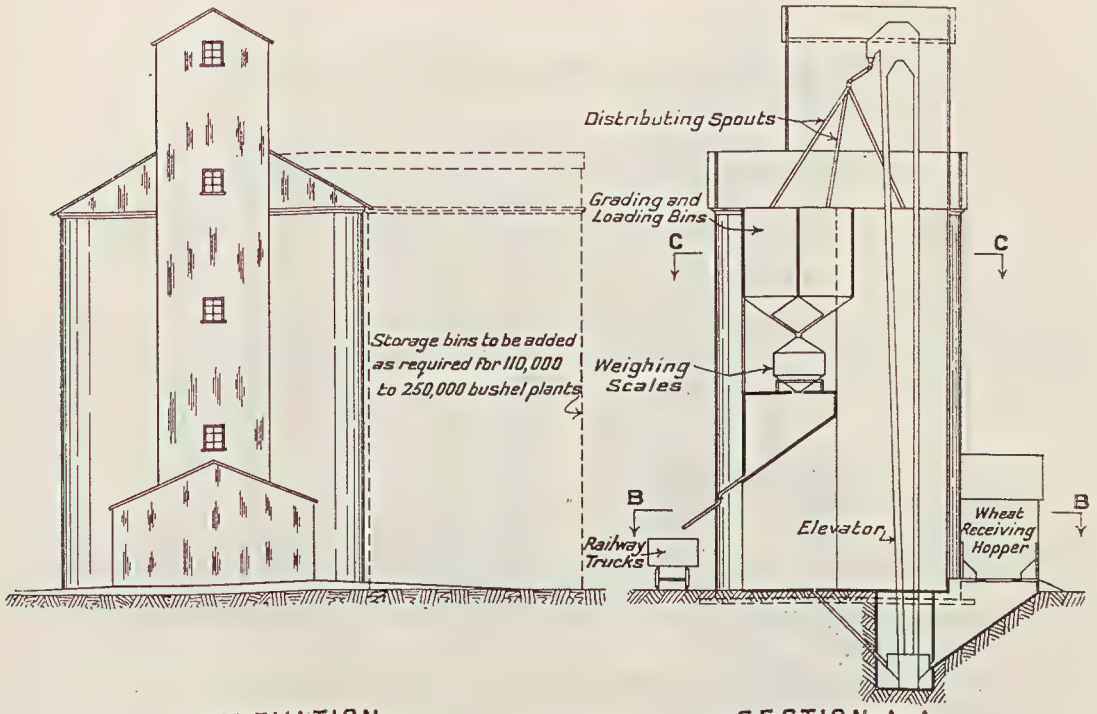


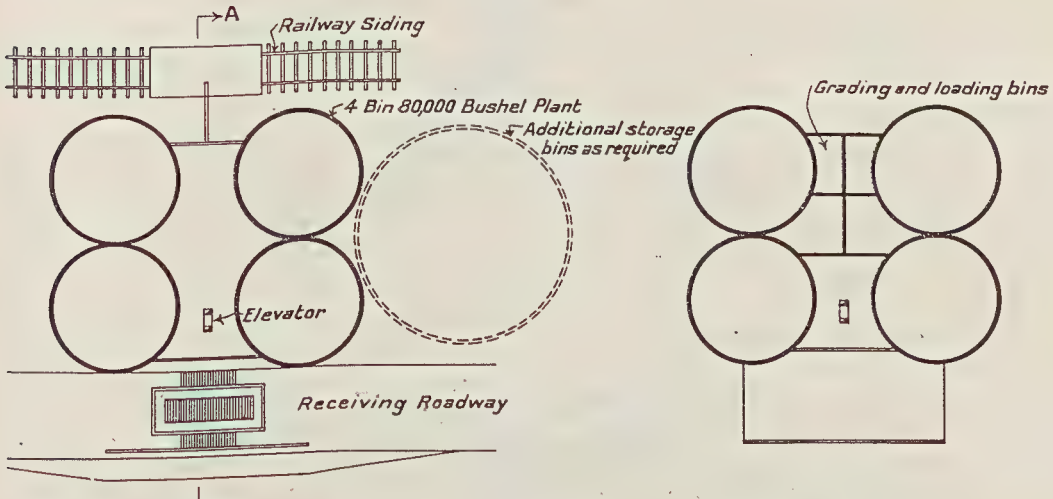
—SECTION C-C—

—50,000 BUSHEL COUNTRY SILO—

ACTING CHIEF ENGINEER
FOR RAILWAY CONSTRUCTION



—ELEVATION— —SECTION A A—

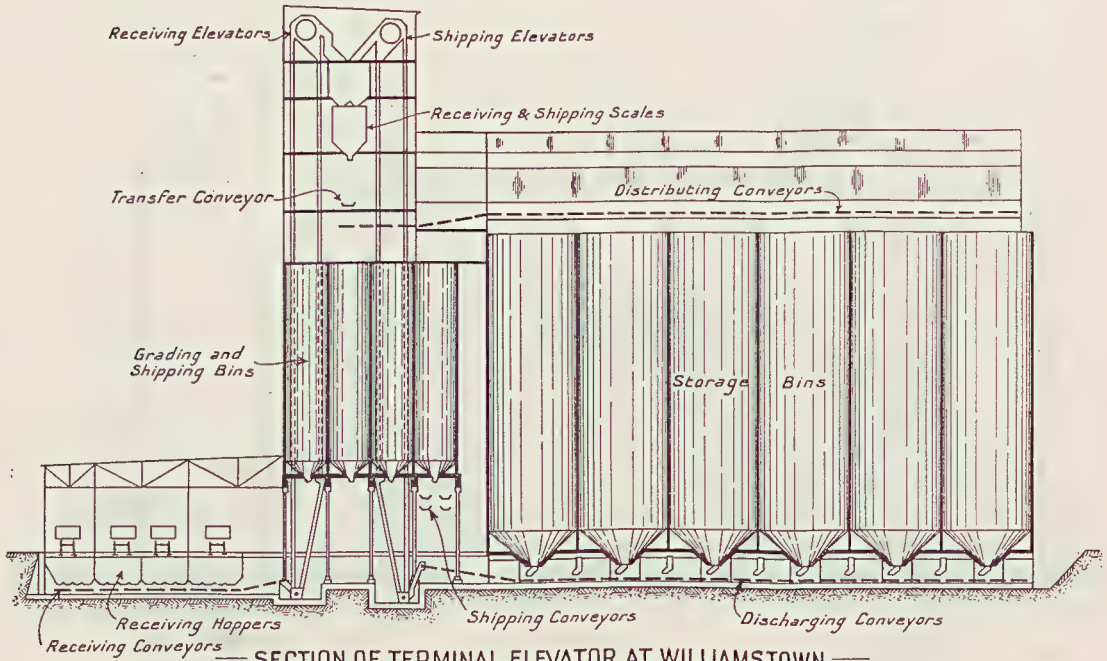


—SECTION B B— —SECTION C C—

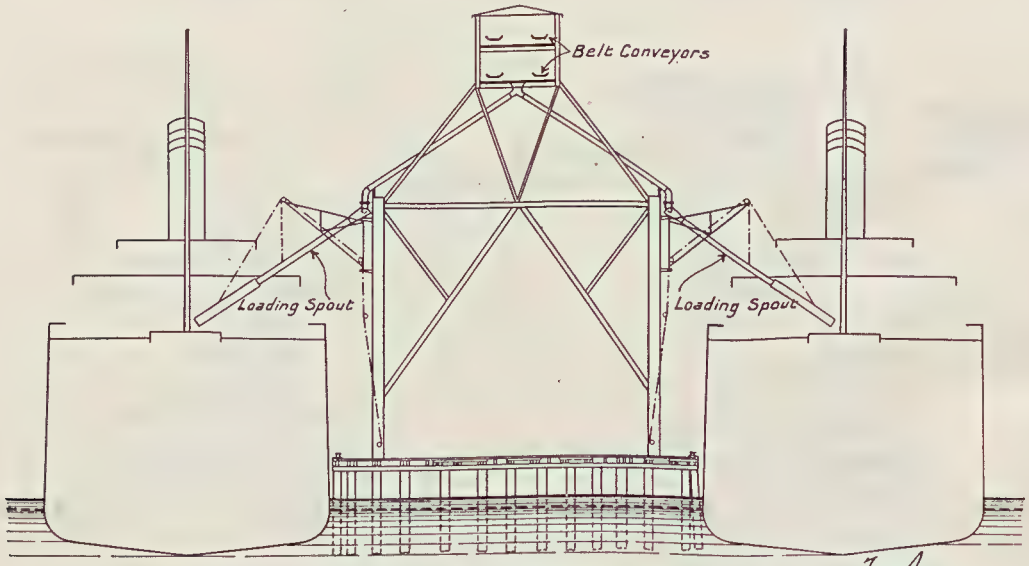
—80,000 BUSHEL COUNTRY SILO—

110,000 - 250,000 bushel plants would be of similar design with additional storage bins and handling facilities.

F. W. Box
ACTING CHIEF ENGINEER FOR RAILWAY CONSTRUCTION



SECTION OF TERMINAL ELEVATOR AT WILLIAMSTOWN



SECTION OF SHIPPING GALLERY
FOR
TERMINAL ELEVATOR AT WILLIAMSTOWN
Showing belt conveyors and loading spouts suitable for loading four ships simultaneously.

ACTING CHIEF ENGINEER
FOR RAILWAY CONSTRUCTION

The Sheep Industry

Helpful Hints to Sheep-men

No. 10—Sheep Nasal Bot (Oestrus Ovis)

By R. N. Wardle, B.V.Sc., Veterinary Officer

[Previous articles of this series, which appeared in the June, July, August, September, November, and December, 1932, and January, February, and March, 1933, issues of the Journal, dealt with the selection of ewes and rams, lamb marking, classing the wool clip, fat lamb raising, the sheep blowfly, foot-rot, worms, liver fluke disease and infectious eye disease.]

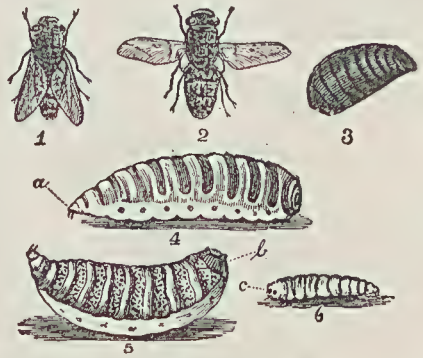
Among sheepmen sheep nasal bot is known as "Grub in the Head." It is the larval or grub stage of a yellowish-grey hairy fly, which is smaller than the common blowfly. It is rare for one of these flies to be seen, since it is an exceedingly fast flier and its flight is noiseless.

In the heat of the day during the summer months the female fly deposits small larvae or grubs one-twelfth of an inch long on and around the nostrils of sheep. During the attack by the fly the sheep become uneasy, and attempt to protect themselves by milling round and pushing their noses against other sheep or into herbage or loose ground. A sheep actually being attacked will rub its nose along the ground and try to keep the fly from striking by brushing at its nose with its feet.

Once the grubs are deposited at the nostrils they make their way up the nose until they ultimately locate themselves in the upper nasal passages and the cavities of the face communicating with them, where they attach themselves to the living membrane.

In these positions they grow until fully developed, when they are about four-fifths of an inch long and one-third of an inch wide. Thus they are slightly larger than the horse bot, to which the sheep nasal bot is similar in that the larval stages is parasitic in an animal. The young larvae are white, and as they develop they become yellow or brown, the eleven segments showing up distinctly. The head-end has two hooked appendages and the tail-end two breathing pores.

After a period of about ten months—springtime—the grubs leave the sheep and fall to the ground, into which they burrow. Here further development takes place, if conditions of heat and moisture be suitable, and in from one to two months' time the flies which have formed burrow out; fertilization of the female takes place, and the life cycle proceeds once more.



1 and 2, Adult Fly (nat. size); 3. Pupa; 4. Full-grown Larva, dorsal view (enlarged); 5. Same, vertical view; 6. Young Larva.

Sometimes the grubs reach parts of the head from which they are unable to escape; when this happens they undergo degeneration and die. Examples of such cases are often seen when a sheep's head is split open.

Symptoms and Diagnosis.

The presence of these parasites in the nasal passages and cavities of the face sets up an irritation to the lining membrane, causing a catarrhal condition which becomes infected with bacteria and discharges at the nostrils, producing the well-known symptom of "snotty nose." Sneezing accompanies this stage of the complaint.

A percentage of sheep infested with the nasal grub will become affected in general health. The irritation set up, with its consequent sneezing, does not allow the sheep to eat their

[Continued on page 208.

F.A.Q. Wheat

Analysis of 1933 Sample

By W. R. Jewell, M.Sc., Agricultural Research Chemist.

THE F.A.Q. wheat sample for 1933 again has a relatively high bushel weight (62 lb.), which, in the past seven years, has been exceeded only by last year's sample. In accordance with the practice for some years past, a portion of this F.A.Q. sample was critically examined, and subjected to analysis and to a milling test in the experimental flour mill.

The sample has a bright appearance, and is free from bleached grain. The percentage of screenings is considerably higher than usual, due mainly to a high content of broken grain. The amount of weed seeds (saffron thistle, barley, wild oats, &c.) is actually less than in the past few years. The moisture content is normal, and the protein content very similar to that of last year. Analytical results, compared with past years, are:—

—	1928.	1929.	1930.	1931.	1932.	1933.
	%	%	%	%	%	%
Moisture ..	9·41	9·20	10·58	11·43	9·31	10·59
Impurities (screenings)	2·5	3·4	2·7	3·5	6·7	8·7
Ash	1·47	1·26	1·33	1·47	1·41	1·39
Protein (N x 5.7)	11·63	10·11	10·87	10·97	9·66	9·35
Bushel Weight (lb.)	61¾	61¾	62	58½	62¾	62

Flour.

No difficulty was experienced in milling the sample, and the flour yield was normal. The gluten contents are lower than was the case last year, but the quality of the gluten showed a decided improvement. This is reflected in the test loaf, obtained by the standard baking test, which is slightly better than last year's, and is of average volume. Comparative figures since 1927 are:—

—	1928.	1929.	1930.	1931.	1932.	1933.
	%	%	%	%	%	%
Flour—						
Yield	70·0	70·4	73·2	73·4	72·8	73·2
Ash	0·48	0·41	0·49	0·54	0·56	0·49
Protein (N x 5.7)	10·11	9·20	9·54	9·58	8·65	8·02
Wet Gluten	31·3	25·8	26·4	29·4	26·1	22·4
Dry Gluten	10·4	8·5	8·6	9·7	8·7	7·6
Water Absorption (qts.) ..	45·0	45·2	41·0	40·5	40·5	40·5
Standard Loaf Volume (c.c.) ..	1,680	1,525	1,610	1,760	1,585	1,620

Bran and Pollard.

Normal yields of bran and pollard were obtained, and analytical data are recorded in the following table:—

—	1928.	1929.	1930.	1931.	1932.	1933.
	%	%	%	%	%	%
Bran—						
Ash	3·68	4·67	3·55	4·27	3·76	3·73
Protein (N x 6.25)	15·77	13·52	15·31	15·57	15·37	12·44
Pollard—						
Ash	3·26	2·52	2·47	3·17	2·85	2·23
Protein (N x 6.25)	17·50	14·83	15·09	15·42	14·74	14·08

Orchard and Garden Notes

By Edward E. Pescott, F.L.S.

The Flower Garden.

DAHLIAS should now be in their prime. To keep up a continuance of bloom, all old flower heads and stems should be cut off regularly. If seeds are required, a few heads should be saved. When all of the petals have dropped, the heads should be cut off, and dried slowly, in the shade. All new varieties are raised from seed, which germinates freely in spring.

Seeds of all winter and spring flowering annuals should be sown now; it is not wise to delay sowing any longer, especially for winter flowers. The seed should be sown in open beds or in pans, in an open, sunny position, and the seedlings should be transplanted as soon as possible, so that the plants may become strongly established while the weather is warm. If strong plants, especially of Iceland poppies, are not produced, they will not bloom until spring. The same applies to winter flowering sweet peas.

Mignonette, nasturtium, and Sturt's desert pea prefer to grow where the seeds have been sown, as they do not take kindly to transplanting.

The present is a very good time to plant out, or to transplant flowering trees and shrubs. The preparation should include a thorough digging, placing some good soil in the bottom of the hole, and planting preferably in the evening. After firming the plant in the soil it should be watered. If hot weather follows planting, it will be an advantage to spray the foliage frequently.

The Vegetable Garden.

All plants of cabbage, cauliflower, and Brussels sprouts should be well cultivated, working the soil well up to the stems of the plants. This is called hilling. The object is to increase the rooting capacity of the plants, as new roots come from the stems so covered by the soil. Occasional dressings of sulphate of ammonia should be given.

A Cactus Dahlia.

All vacant plots of land should be sown with rape or peas, which should be dug in when full grown. This gives a needed supply of humus to the garden. In addition, the autumn dressing of lime or gypsum should be given to the whole of this section.

Seeds of all types of onion may be sown in the warmer districts. The seed may be sown either in seed-beds or in the garden rows.

The Orchard.

Considerable attention has been directed to the use of chemically-treated bands for the control of Codling moth. Much success has been achieved in America; and results in a few Victorian orchards have been such as to encourage a fuller test of this method. Bands of corrugated paper, chemically treated, are fastened around the stem of the trees; and when the larvae enter the bands, it is stated that they are killed by the action of the chemicals.

Strips of corrugated paper are dipped in a solution of 1 lb. of beta-napthol (technical grade), and 1½ pints of lubricating oil (red engine type). The beta-napthol and oil are mixed, and then heated in a container until the beta-napthol is quite dissolved in the oil. Too much heat should be avoided, and the free flame must not come in contact with the solution or with the fumes.

It must be emphasized that such banding is only an adjunct to the usual spraying, which must be carried out regularly.

Professional Papers

[This section is devoted to professional papers and articles of a scientific character.]

Note on the Effect of Cultivation on Soil Micro-organisms

By F. Penman, M.Sc., Assistant Research Chemist, Department of Agriculture, Victoria, and Phyllis M. Rountree, M.Sc., Research Student in Soil Bacteriology for the Australian Council for Scientific and Industrial Research.

IT is accepted that stimulation of activity of certain micro-organisms, especially those concerned with accumulation of nitrate, is among the benefits resulting from cultivation of soil (1). Most of the work on which this conclusion is based has compared cultivated bare fallow with land carrying a crop, pasture, or weed growth. In such comparisons, two components enter into the effect attributed to cultivation, namely, that of soil working *per se,* and the factor due to elimination of weed growth. That plant growth usually has an adverse influence on accumulation of soil nitrate is known (2). In order to evaluate the effect of the first component, comparison may be made between cultivated bare fallow and unbroken land kept clear of vegetation by hand removal of volunteer growth, as soon as it appears, with minimum soil disturbance. Work of this kind has been done by the Victorian Department of Agriculture during the past three years at three locations widely different in soil type, and general environment. Systematic investigation of nitrate development in these soils has led to the general conclusion that nitrate accumulation during a fallow season in unbroken bare soil is of the same order as in cultivated bare fallow. A similar result has been reported from Kansas (3).

The object of the present work was to determine whether microbiological activity in the two types of soil treatment is in accordance with their similarity in nitrate development. Marked differences in surface character between the two treatments make it difficult to reconcile conventional ideas on stimulation of microbial nitrification by stirring and mulching of soil with this observed similarity in nitrate accumulation during a fallow period of approximately a year.

Plots at the State Farm, Rutherglen, and at Longerenong College, Dooen, were used for the present purpose. Conditions at Rutherglen have been described (2). At Longerenong the plots were located on Wimmera grey soil, a heavy calcareous soil which behaves as a self-mulching clay loam. The reaction of surface soil at the plot site is pH 8.2. Both soils are normal arable soils in the sense that they are well drained, are subjected to moderate climatic conditions, and, when adequately managed under bare fallow conditions, are rapidly brought to a condition of good tilth.

Soil treatments were started before seed-time, 1930, with ploughing of the fallows and clearing of the unbroken plots. Thereafter both treatments were kept free from vegetation, the fallows being cultivated at suitable intervals, while the unbroken plots were kept clean by hand. One plot of each type was investigated at each location, the plots being adjacent, and approximately 1-20th acre in size.

After treatment had proceeded for about nine months, soil sampling for microbiological examination was instituted. This was in January, 1931, nitrification studies having shown that accumulation of nitrate in Victorian soils is most active during summer. At the time of sampling, the unbroken plot at Rutherglen was in a hard-set condition, while that at Longerenong had developed a flaky surface with a self-formed mulch about ¼-inch deep. At both locations the fallow plots had

been cultivated several times since ploughing, and were in good tilth with mulches about 3 inches deep.

Methods of examination and description of soil samples were similar to those outlined in a previous report (2). Soil samples were composites from 10 bores per plot to a depth of 6 inches.

Results of Examination.

Table I. shows that throughout the series of tests there were no significant differences between unbroken bare soil and cultivated bare fallow at either location, as far as moisture and nitrate content and total bacterial count are concerned. It would appear then that general microbial activity is similar in the two treatments, in spite of the difference in their surface character. A notable feature of the bacterial counts is their diminution in Longerenong soil during the tests, presumably as the result of continued subjection to relatively dry conditions (1). This effect was most marked during the first week, in spite of a rainfall of 0.14 inch on 25th January. At Rutherglen, in the same period, bacterial counts increased slightly, there being a rainfall of 0.23 inches on 25th January. At both locations there was no rain during the second week, bacterial counts at Rutherglen falling considerably. The difference in reaction to rainfall at the two locations may be connected with the fact that rain fell only on the day prior to the second sampling, and as well as being a heavier fall at Rutherglen than at Longerenong, its effect would probably show more quickly in light Rutherglen soil than in the much heavier soil at Longerenong. The fallow plot at Rutherglen was cultivated on 26th January, 1931, after the rain of the previous day.

Soil moisture values as set out in Table I. are low, field moisture capacity and wilting coefficient for the two types of soil being approximately 14 per cent. and 4 per cent. respectively for Rutherglen soil, and 34 per cent. and 17 per cent. respectively for Longerenong soil. It is evident that mean moisture values for the period under review were barely above the respective wilting coefficients, indicating that "available" soil moisure was low.

Taken as a whole, the data for nitrate nitrogen in Table I. show a definite rise during the period of sampling. It appears, therefore, that nitrification processes were able to continue in spite of soil moisture values so low that general microbial activity was inhibited. Soil plaques for investigation of non-symbiotic nitrogen-fixing organisms showed that Rutherglen soil from both treatments contained Azotobacter in very active condition throughout the period. The plaques were covered with large clear Azotobacter colonies—type 1 (2). In Longerenong soils, while, as in the case of Rutherglen soils, there was no difference between the two treatments, Azotobacter colonies were small, and present in smaller numbers. Development of Azotobacter in plaque tests on soils from both locations was independent of the presence of calcium carbonate and potassium phosphate in the plaques. There was evidence of marked anaerobic activity in Rutherglen plaques, but no indication of such activity for Longerenong soils.

TABLE I.—MOISTURE, NITRATE NITROGEN, AND TOTAL BACTERIAL COUNT FOR CULTIVATED BARE FALLOW AND UNBROKEN BARE SOIL AT RUTHERGLEN AND LONGERENONG, 1931.

(Moisture as per cent. dry soil, nitrate nitrogen as parts per million dry soil, total bacterial count as hundred thousands per gram of soil.)

	State Farm, Rutherglen.						Longerenong College, Dooen.					
	Cultivated Bare Fallow.			Unbroken Bare Soil.			Cultivated Bare Fallow.			Unbroken Bare Soil.		
	Moisture.	Nitrate Nitrogen.	Bacterial Count.	Moisture.	Nitrate Nitrogen.	Bacterial Count.	Moisture.	Nitrate Nitrogen.	Bacterial Count.	Moisture.	Nitrate Nitrogen.	Bacterial Count.
19th January, 1931 ..	7·3	25·5	57	6·9	27·8	48	18·6	9·2	60	17·7	10·7	44
26th January, 1931 ..	7·3	26·2	64	6·9	33·5	64	18·6	11·0	36	18·7	11·9	31
2nd February, 1931 ..	5·5	37·5	42	5·0	33·5	43	16·3	12·3	24	16·3	13·2	22
Mean	6·7	29·7	54	6·3	31·6	52	17·8	10·8	40	17·6	11·9	32

The general conclusion is that total bacterial numbers, and activity of Azotobacter are similar in the two treatments at both Rutherglen and Longerenong. It appears that cultivation of normal arable soils in Victoria, from the aspect of soil working and mulching, does not lead to modification of soil conditions during summer to an extent capable of materially affecting general microbial activity and nitrification processes.

Comparison of Microbial Activity at Rutherglen in Early Spring and in Summer.

General microbial activity was considerably greater in bare Rutherglen soil during winter and early spring, 1930 (2), than during the following summer period investigated in the present work. The plots sampled at both periods lay on adjacent areas of the same soil type.

Table II.—Comparison of Rutherglen Bare Soil in Early Spring and in Summer.

—	Mean 20th July, 1930, to 15th September, 1930.	Mean 19th January, 1931, to 2nd February, 1931.
Total bacterial count (hundred thousands per gram of soil) ..	92	53
Soil moisture (per cent. dry soil)	11·7	6·5
Soil temperature at depth of 6 inches (°F.)	47	74

Table II. sets out conditions during the two seasons, the figures shown for the summer period being means of the two treatments. It is likely that the relatively much greater soil moisture content during the early spring months accounts for the higher microbial activity shown during this period (1).

Activity of Azotobacter, on the other hand, was at a higher level in summer than in winter and early spring. Apparently higher temperature induced greater activity of these organisms (1) in spite of low soil moisture values. The summer samples reached type 1 development in plaque tests without the use of lime or potassium phosphate, which were necessary to give comparable development in winter samples.

Additional work at Longerenong College.

Because of comparatively low nitrate values for Longerenong soil shown in Table I., and because Azotobacter development in plaque tests compared less favorably with those from Rutherglen soil than the normal nitrate-producing capacity of the two soils would indicate, further samples were taken from cultivated bare fallow of the same type at Longerenong during February, 1932. The samples were composites from 10 bores to a depth of 6 inches. Table III. gives the results of two examinations at an interval of a week, the figures being expressed in the same units as those in Table I.

Table III.—Cultivated Bare Fallow, Longerenong College, 1932.

Date.	Moisture.	Nitrate Nitrogen.	Total Bacterial Count.
1.2.32 ..	9·9	34·7	31
8.2.32 ..	22·0	41·2	191

The first set of results, with the exception of the nitrate value, is similar to those for 1931, as was also the development of Azotobacter in plaques. During the week, rain aggregating 1.05 inch fell, causing a considerable rise in soil moisture, and leading to considerable alteration in general microbial activity, which, as shown in Table III., increased about six-fold. Density of Azotobacter increased from 155 to 300 colonies per gram of soil, and type 1 Azotobacter development was obtained in the second set of plaques by the use of potassium phosphate. "Ordinary" and calcium carbonate plaques remained similar to those previously obtained. It was a notable feature of the general counts for heterotrophic organisms and actinomyces that the latter constituted about half the total count before the rain, and were virtually negligible in the second week. This is in accordance with experience elsewhere (1). Dilution tests for nitrifying organisms along the lines previously described (2) showed positive results for nitrifiers in dilutions up to 1 in 10,000.

The available evidence suggests that nitrate accumulation in Longerenong soils may be ascribed to similar processes to those in operation at Rutherglen, namely, to activity of Azotobacter in association with nitrifying flora

of normal character. It would appear, however, from the results in 1932 as compared with those for 1931, that these processes are more severely inhibited by dry conditions in Longerenong than in Rutherglen soil, this effect doubtless being due to the heavier character of the former.

Summary.

Cultivation from the aspect of soil working and mulching, as distinct from its effect in eliminating weed growth, has been studied with regard to its influence on microbiological activity in two types of normal arable soil. As well as showing wide contrast in texture and general soil character, and some difference in climatic environment, the two locations are about 230 miles apart.

In both soil types, capacity for nitrate accumulation is attributed chiefly to activity of Azotobacter in association with normal nitrifying flora.

It was found in field plots that total bacterial numbers and activity of Azotobacter were quite similar in cultivated bare fallow and in unbroken bare soil at both locations after soil treatment had been in operation for about nine months. At the time of the present work, soil moisture and nitrate nitrogen also showed no significant differences between the two treatments at either location.

It is concluded that the stirring and mulching components of cultivation are unable to effect modification of soil conditions in the Victorian wheat area during summer to an extent capable of material influence on general microbial activity and nitrification processes.

Acknowledgments.

Soil sampling and plot management at Rutherglen were carried out by Mr. H. L. Hore, B.Ag.Sc., and at Longerenong College by Mr. A. A. Lee, B.Ag.Sc. Laboratory assistance in chemical work was given by Mr. J. K. Skene, M.Ag.Sc. To these officers of the Victorian Department of Agriculture the authors are indebted for valuable assistance.

References.

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Book Review:

Orchard and Small Fruit Culture

by E. C. Auchter and H. B. Knapp

(Chapman and Hall Ltd., London; John Wiley and Sons, New York, 2nd Edition, 1932.)

THOUGH this text-book is primarily intended for the use of American college students, it would prove interesting and instructive to growers of deciduous fruits in Victoria. The practices and methods described are essentially applicable to American conditions, and therefore are not always the same as accepted practice in this State. For this reason the book could not be regarded as a hand manual for Victorian orchardists.

Every aspect of deciduous fruit culture and small fruit culture from the selection of the land to the final marketing of the produce is dealt with in a clear and simple manner. The section on harvesting, storing and marketing is particularly interesting, and contains much valuable statistical material.

Subjects as pollination, tree growth, fruit bud formation, &c., are treated in such a manner that the reader will become acquainted with the scientific fundamentals which affect tree processes, and form the basis of sound orchard practice.

A list of references is appended to each section, and this list will be especially useful to students.

The volume is profusely illustrated and contains many tables. In this edition, tables, statistical material and references have been revised, and the references now cover scientific publications up to the early part of 1932.

The net price of the book is 31s.; this means that its cost here would be in the region of £2.

A.G.S.

Stallion Register 1932-33

(Under the Horse Breeding Act 1928)

Part. I—Registrations prior to 1st March, 1933

Cert. No.	Name.	Age* and Class.	Owner and Address.
934	Abbots Best ..	A. D.	H. R. Richards, Trawool
379	Abdulla King ..	A. P.	E. Burnside, Nathalia
312	Admiral Roy ..	6 L.	H. A. Kent, Albert Park
966	Allan Stewart ..	A. D.	W. B. Tonks and Sons, Caniambo
579	Allandale ..	A. D.	E. A. Altmann, Rainbow
910	Allen Pronto ..	3 L.	W. D. Taylor, Spring Vale
527	Allendale ..	4 D.	A. J. Trask, Irrewarre
810	Allendale Sensation	3 D.	A. J. Gordon, Broughton
962	Almont Wilkes ..	A. L.	G. Einsiedel, Clayton
66	Amyville Fashion	A. D.	H. Richards, Trawool
850	Anchor	A. L.	A. A. Toll, Essendon
770	Angle Jack ..	A. L.	C. T. Hillas, Tallangatta
497	Ardlaw Heir ..	A. D.	W. Black, Bundoora
443	Ardmore ..	A. D.	J. B. Pollock, Derby
744	Armadales Elect ..	A. D.	R. V. Colliver, Cora Lynn
341	Arthurs Pride ..	4 D.	F. H. Coombs and Son, Mangalore
35	Athol Pat of Fenwick	6 P.	Mrs. A. D. Maclean, Yan Yean
33	Aussie Didblitz of Fenwick	A. P.	Mrs. A. D. Maclean, Yan Yean
210	Aviator	3 D.	H. Trimble, Cosgrove
282	Balgrochan Warrior	A. D.	J. Galloway, Majorca
226	Ballygolly Again..	6 P.	J. J. Lobb, Cope Cope
331	Bando	A. D.	J. Noonan, Birchip
195	Banjo	A. P.	Mrs. S. A. Nicol, Dandenong
39	Baritone ..	A. D.	J. Tallent, Berrybank
894	Barkoola Prince ..	3 P.	W. Forster Woods, Melbourne
607	Barney	A. P.	J. Bell, Merino
88	Barney II. ..	A. P.	A. W. Thompson, Hamilton
798	Baron	A. D.	J. Carroll, Mudgegonga
439	Baron Banjo ..	3 D.	P. K. Tomkins, Wando Vale
619	Baron Baritone ..	3 D.	A. G. Mibus, Croxton East
539	Baron Black ..	3 D.	H. Gittins, Bendigo
483	Baron Boy ..	4 D.	R. Della Vedova, Donald P.B.
671	Baron Carlyle ..	A. D.	E. C. Gibbs, Kew
460	Baron Cedric ..	A. D.	W. G. Wilkinson, Yarrawonga
370	Baron Chief ..	A. D.	S. E. McIntyre, Condah
635	Baron Clover ..	A. D.	J. A. Lord, Boigbeat
610	Baron Clyde ..	5 D.	D. Chisholm, Swan Hill
846	Baron Crawford ..	A. D.	L. J. King, Quambatook
953	Baron Dale ..	A. D.	E. Coad, Cobden
660	Baron Dale ..	3 D.	Rigney Bros., Chinkapook
159	Baron Darnley ..	A. D.	G. E. McManus, Sea Lake
634	Baron Douglas ..	A. D.	T. Bray, St. Arnaud
105	Baron Douglas ..	A. D.	T. Buckley, Romsey
861	Baron Estill ..	5 L.	J. Medlyn, St. Arnaud
545	Baron Fashion ..	A. D.	A. L. Hamilton, Corryong
303	Baron Footprint ..	A. D.	H. C. Wilson, Raywood
701	Baron Fyvie ..	A. D.	Shields Bros., Youanmite
787	Baron Jack ..	A. D.	Mrs. E. E. Pickering, Hopetoun
886	Baron King ..	A. D.	W. Watts, Kamarooka
639	Baron Lad ..	3 D.	R. G. Ladlow, Dooen North
788	Baron Lee ..	A. D.	J. Beechey, Noorat
131	Baron Lee ..	A. D.	G. Tower, Archdale
464	Baron Loch ..	A. D.	W. Kempton and Sons, Camperdown
531	Baron Mac ..	4 D.	W. Condon, Toolern Vale
711	Baron Major ..	A. D.	W. Hand, Willenabrina
87	Baron Masterstroke	6 D.	Elwood Bros., Wallace
227	Baron May ..	A. D.	J. J. Quinn, Elmore
485	Baron Mountain Monarch	4 D.	H. Gilmore, Thornton
132	Baron Newfield ..	A. D.	W. Jardine, Rathscar
368	Baron O.G. ..	4 D.	A. T. Creen, Galah
789	Baron Pettie ..	A. D.	J. Price, Mologa
86	Baron Silk ..	A. D.	Ellwood Bros., Wallace
959	Baron Style ..	A. D.	J. P. Belleville, Watchem
796	Baron Victor ..	A. D.	A. L. Smith, Ellerslie
678	Baron Wattee ..	A. D.	A. C. Chapman, Minyip
43	Baron Weerite ..	A. D.	J. Manifold, Weerite
888	Baron Willie ..	A. D.	L. A. C. Morris, Numurkah
425	Baronet ..	3 D.	R. H. Williams, Crowlands
191	Barons Best ..	A. D.	Mrs. M. J. Bartlett, Yarrock
56	Barons Fancy ..	3 D.	S. Stokes, Collingwood
955	Barons Pride ..	A. D.	H. W. O'Berin, Goornong
325	Barons Royal Chief	A. D.	C. Appleby, Slaty Creek
802	Barons Star ..	A. D.	J. Davison, Donald P.B.
908	Baroona Boomerang	A. D.	A. Turnbull, Coleraine
926	Barry Boy ..	5 L.	B. O'Sullivan, Wattle Park
729	Basil Derby ..	3 L.	G. Tee, Kyabram
511	Battyll	3 T.	D. Smith, Yea
2	Bay Garvin ..	5 D.	H. G. Green, Coonewarre
668	Beau Cavalier ..	5 D.	J. C. Wallis, Nhill
32	Beau Fils ..	A. T.	W. E. Mitchell, Corryong
551	Beau Geste ..	5 L.	S. Christie, Wesburn
618	Belgians Boy ..	3 D.	H. G. Kruger, Croxton East
956	Belgians Choice ..	A. D.	F. R. Widdicombe, Merino
695	Belle Vue Brilliant Morn	3 D.	A. Gillis, Newmarket
845	Belmain Belmont	A. D.	L. J. King, Quambatook
104	Belmont ..	A. D.	J. Mildenhall, Ensay
474	Belmont Abbey ..	4 L.	E. Dunbar, Belmont
672	Belmont Again ..	A. D.	O. Jaeschke, Angip
196	Belmont Print ..	A. D.	J. M. Egan, Woodleigh
146	Belmont Stephen..	A. D.	A. J. D. McRae, Gre Gre North
89	Ben Hamilton ..	A. D.	L. McKenzie, Nandaly
315	Ben Lomond ..	A. D.	F. E. Opelander, Swan Hill
121	Ben Model ..	A. D.	H. Adams, Yaapeet
658	Benowrie Baron Dale	5 D.	S. Gould, Wedderburn
685	Berkeley Bantam	A. P.	R. Crozier, South Morang
358	Berra Bach ..	A. P.	O. W. Zerbst, Diapur
767	Berwick Victor ..	A. D.	R. Day, Nathalia
957	Bingen	A. L.	F. C. Luck, Shepparton
223	Blackadder ..	A. T.	J. G. Adams, Mansfield
851	Black Bunny ..	4 P.	A. Hayes, South Melbourne
309	Black Jack ..	A. P.	R. W. Jukes, Maryborough
659	Black Prince ..	5 D.	W. J. Ibbs, Gannawarra
863	Black Prince ..	5 P.	H. W. Rundle, Warracknabeal
342	Black Prince ..	6 L.	H. R. Richards, Trawool
960	Black Shepherd ..	A. D.	Simpson Bros., Yambrina
836	Black Wasp ..	A. P.	E. Wheelahan, Ballan
31	Blackthorn of Penniwells	A. P.	Miss M. Small, Hawthorn
748	Blairs Footprint ..	6 D.	D. and J. Lyons, Roseberry East
44	Blairs Laddie ..	6 D.	C. G. McKenzie, Boonoonar
133	Blairs Pride ..	A. D.	H. E. Poulton, Hopetoun West
475	Bloomfield Craig..	5 D.	R. H. Larcombe, Mt. Moriac
573	Blue Peter ..	5 D.	Morton and Son, Balliang East
830	Bob Avon ..	6 P.	H. Sawers, Ascot Vale
347	Bob Craig ..	A. D.	Dunstan Bros., Jeffcott
842	Bob Simmer ..	5 P.	T. Darcy, Mooroopna
509	Bobs	A. D.	A. O. Allen, Murrayville
901	Bobby	A. P.	G. Officer, Woolsthorpe
216	Bobniak ..	A. L.	H. F. Clarke, Miepoll
40	Bold Acton ..	A. D.	D. Major, Goroke
508	Bold Arthur ..	A. D.	G. I. Mulholland, Barwon Heads
611	Bold Bill ..	4 P.	J. R. Morrison, Terang
947	Bold Boy ..	A. D.	N. A. Proctor, Caulfield
844	Bold Boy ..	3 P.	N. A. Merryfull, Rushworth
442	Bold Briton ..	A. D.	Byron Bros. Callawadda
572	Bold Captain ..	A. D.	C. B. Werner, Jeparit
41	Bold Dale ..	6 D.	Westendorf Bros., Dimboola

* *Note.*—Age in years. A., aged; D., draught; L., light; P., pony; T., thoroughbred.

Stallion Register 1932-33—*continued.*

Cert. No.	Name.	Age* and Class.	Owner and Address.
134	Bold Douglas ..	A. D.	R. Stewart, Barwite
57	Bold Drumcross ..	3 D.	P. and M. Walsh, Catani
4	Bold Everest ..	3 D.	R. Carroll, Perth
655	Bold Favorite ..	5 D.	A. White, Bridgewater
733	Bold King ..	A. D.	J. Keneally, Dandenong
376	Bold Pat ..	5 D.	F. J. Glen, Walpeup
712	Bold Scott ..	A. D.	H. and L. Lear, Mitre
657	Bold Simon ..	3 D.	J. A. Collins, Fenton's Creek
326	Bold Squire ..	A. D.	E. F. Schmidt, Kellalac
795	Bold Success ..	A. D.	J. Rumbold, Laanecoorie
893	Bold Voyage ..	4 L.	G. McDonnell, Mt. Egerton
630	Bold Wallace ..	6 D.	W. Wohlers, Pinnaroo
922	Bon Accord ..	A. D.	R. Brindley, Avondale
283	Bon Wickliffe ..	A. L.	Mrs. L. E. Allen, Beulah
479	Bona Vista ..	5 D.	C. R. McKenzie, Cressy
848	Bonnie Baron ..	A. D.	R. N. Scott, Kongwak
852	Bonnie Brae ..	A. D.	L. Gould, Kinnabulla
9	Bon ie Caesar ..	A. L.	C. P. Campbell, Glenorchy
298	Bonnie Dignity ..	5 D.	D. N. McDonald, Miram
375	Bonnie Dundee ..	4 P.	W. H. Barmby, Yaapeet
725	Bonnie Knight ..	A. D.	A. D. McLennan, Derrinal
553	Bonnie Lad ..	4 D.	A. Gibbard, Vectis East
269	Bonnie Prince ..	3 D.	M. P. Cleary, Nooramunga
103	Bonnie Salisbury ..	A. D.	C. H. Feldtman, Major Plains
790	Bonnie Star ..	A. D.	E. S. Gillespie, Rockbank
838	Bonny Mac ..	A. D.	A. Walter, Glenthompson
122	Boondilla Viceroy	A. D.	J Dalrymple, Willenabrina
571	Boorongie Prince ..	6 D.	J. Grant, Chinkapook
605	Boquhan Mac ..	3 D.	Hawkins and Sons, Finley, New South Wales
291	Bowview Belmont	4 D.	Mrs. R. Cook, Thalia
768	Breastknot ..	A. D.	W. J. Moll, Dimboola
147	Brewan	A. T.	W. Woodhouse, Stratford
627	Bright Bells ..	A. L.	M. Spittle, Birchip
690	Bright Green ..	A. T.	J. O'Brien, Culgoa
106	Bright Star ..	A. D.	J. Walker, Corio
197	Bright Treasure ..	A. D.	M. Thompson, Yalca
778	Brilliant ..	4 P.	W. T. Mitchell, Lower Bethanga
849	Brilliant Jim ..	A. P.	R. N. Scott, Kongwak
684	Brilliant Morn ..	A. D.	R. W. Crozier, South Morang
736	Brilliant Star ..	3 D.	J. King, Quambatook
738	Brilliant Youth ..	A. D.	L. Walter, Tatura
30	Britannia ..	6 D.	C. S. Rodda, Warracknabeal
700	Britons Bold ..	A. D.	F. W. Lennecke, Detpa
951	Brogyntyn Handyman	A. D.	E. H. Nolte, Merino
451	Broughdoun Underslade	3 D.	J. Henderson, Baulkamaugh
431	Brown Abbey ..	6 L.	A. J. Glen, Birchip
123	Brown Alexander	6 D.	A. Thompson, Werribee
465	Brown Brilliant ..	A. D.	W. Cobbledick, Bunbartha
779	Brunstane Duplicate	A. D.	J. M. Rogers, Oberon, N.S.W.
284	Buchlyvies Choice	A. D.	A. Mills, Byrneville
15	Bullara Dale ..	4 D.	R. Carroll, Perth
3	Buonacque Silver Morn	3 D.	Mrs. H. Wharton, Manangatang
601	Buonacque Sun Morn	4 D.	Irving and Sons, Bena
603	Burnbank ..	3 D.	E. Mibus, Katyil
760	Burnealto ..	A. L.	C. Caldwell, White Hills
63	Burnfoot Ideal ..	4 D.	W. C. Fraser, Yerong Creek
61	Burnfoot Style ..	A. D.	S. J. Lynn, Orbost
228	Burnside Baron ..	A. D.	H. C. Younger, Greta
941	Bylands Brilliant ..	A. D.	H. D. Adams, Kotupna
45	Byrnwoods Pride ..	A. D.	A. T. Hercus, Hayanmi
859	Byrnwoods Trimmer	3 D.	D. R. White, Janiember East
879	Capitalist ..	A. D.	A. K. Urquhart, Hexham
135	Captain Black ..	A. T.	J. Flannagan, Omeo
815	Captain Llewellyn	A. L.	Horne and Sons; Balmoral
918	Captain Lochiel ..	3 L.	Powling and Son, Terang
422	Captain Regulus ..	4 D.	R. Phillips, Tatyoon
29	Captain Wood ..	6 L.	J. A. Menzel, Hamilton
488	Caravis	A. P.	E. McKay, Wodonga West
102	Carinas Degree ..	6 D.	J. L. Morrison, Boinka
192	Carluke	A. D.	H. McCluskey, Strathmerton
911	Carmichael ..	A. D.	Mrs. M. Newman, Benalla
576	Carmyle ..	4 D.	R. V. Colliver, Cora Lynn
204	Carovita	A. P.	L. V. Ross, Morwell
461	Cavalier Supreme	A. D.	J. C. Wallis, Kaniva
136	Cedric Hero ..	A. D.	J. F. Harrington, Tempy
750	Centredale ..	A. D.	J. Trethowan, Rockbank
512	Ceron Chief ..	3 D.	A. Stokes, Abbotsford
741	Cherry Boy ..	3 D.	Mrs. K. V. Taylor, Tullibigeal New South Wales
654	Chief Alex ..	3 D.	J. A. Collins, Fenton's Creek
812	Civilian	3 T.	F. Hoystead, Mentone
822	Clairs Pride ..	A. D.	A. Nunn, Birchip
360	Clan Newton ..	A. D.	A. Niklaus, Peechelba
771	Clan Rai ..	3 D.	H. B. Newell, Murra Warra
266	Clan Stewart ..	4 D.	T. G. Bartlett, Gerang Gerung
16	Claymore Junior ..	A. P.	J. P. Hanrahan, Ballan
756	Cleveland Viceroy	3 D.	Craven Bros., Toolamba
743	Cliffdale ..	6 D.	J. McGee, Beulah
761	Clyde	3 D.	G. Officer, Woolsthorpe
868	Clyde Bank ..	A. D.	J. A. McMillan, Swan Hill
190	Clyde Laddie ..	A. D.	T. Watkins, Euroa
8	Clydebank Sunbeam	3 D.	F. A. Lehmann, Lismore
818	Coast Guard ..	A. D.	A. G. Turnbull, Winnieburn North
597	Cock O'The North	3 D.	N. C. Hodgson, Hedley
931	Cole King ..	A. L.	S. Everett, Toora
925	Collarado ..	4 L.	D. Shananghan, Warracknabeal
535	Colonel Erskine ..	3 D.	Millard Bros., Deans Marsh
329	Colonel Garfield ..	A. D.	Millard Bros., Deans Marsh
430	Commodore ..	A. P.	W. J. Greaves, Lyndhurst
46	Commodore Nut ..	A. P.	J. Manifold, Weerite
932	Confidence ..	4 P.	C. O'Neill, Upper Sandy Creek
229	Conqueror ..	A. D.	C. J. Bowd, Sea Lake
878	Cooring Dale ..	A. D.	A. N. Hamilton, Bannerton
138	Cooring Monarch ..	A. D.	A. Murray, Coldstream
820	Corporal Kelvin ..	A. D.	E. D. McCann, Lake Charm
948	Count Zarynoff ..	A. D.	J. M. Egan, Bunding
872	Craig Athol ..	A. D.	A. W. Green, Marungi
409	Craig Avon ..	A. D.	C. B. Hill, Colbinabbin
943	Craigie Bold Venture	3 D.	A. Arnold, Warracknabeal
899	Craigie Lad ..	5 D.	T. McGrath, Minyip
629	Craigie Masterstroke	A. D.	A. Arnold, Werrigar East
944	Craigie Radiant ..	3 D.	A. Arnold, Werrigar East
945	Craigie Refiner ..	3 D.	A. Arnold, Werrigar East
496	Craigie Royal ..	4 D.	L. Brennan, Beulah
946	Craigie Winalone ..	4 D.	A. Arnold, Warracknabeal
148	Craigieright ..	A. D.	E. W. Linke, Angip
198	Craigs Ideal ..	A. D.	Mrs. A. Trollop, Cope Cope
933	Craigwillie of Bolobek	A. D.	W. Walter, Tatura
137	Crightons Tim ..	A. P.	S. A. Greaves, Narre Warren
307	Crofthead Douglas	A. D.	A. Faulkner, Inverleigh
950	Cronje Wilkes ..	A. L.	G. B. Mackie, Camperdown
17	Cruncher ..	A. D.	Sharp and Taylor, South Melb.
67	Crystal Tide ..	A. D.	A. Dickins, Corowa
85	Culbo	A. P.	A. W. Thomson, Hamilton
387	Cullodens Return	3 L.	O. Rogasch, Rainbow
949	Cymbrel ..	A. L.	S. Hancock, Poowong
149	Cymro Bar ..	A. P.	J. Corcoran Amphitheatre
548	Cymro Harold ..	A. P.	E. J. Boyle, South Lillimur
713	Cyndette ..	A. P.	J. R. Shingles, Maffra
5	Cyprus Grove Baron View	3 D.	Forge Bros., Tamworth
313	Dalcrombie ..	A. D.	J. H. Roberts, Lalbert
972	Dalla Derby ..	A. L.	F. W. Shillito, Yendon
68	Dalmore Again ..	A. D.	L. Hill, Lake Bolac
285	Dalmore Dale ..	6 D.	Mrs. S. A. Trotman, Nyarrin
101	Dalmore Dan ..	A. D.	F. J. Matthews, Crowlands
909	Dalmores Choice ..	A. D.	A. G. Turnbull, Winnieburn North
698	Dalmores Pride ..	A. D.	A. B. Moyle, Yaapeet
174	Dalradient ..	A. D.	J. B. Ferguson, Waubra
357	Dandy Dick ..	A. P.	W. Hudson, Merbein West
173	Dandy Duke ..	A. P.	Kong Meng Bros., Longwood
323	Dandy Jim ..	A. P.	S. Fitzpatrick, Orford
853	Dandy Luck ..	A. P.	Mrs. M. L. Johnson, Doreen P.O.
356	Dans Design ..	A. L.	J. W. Turnbull, Mildura
317	Darlings Comet ..	A. D.	Brock Bros., Moe
410	Dave Douglas ..	A. D.	B. Schultz, Ni Ni Well
697	Derby Childe ..	5 L.	L. J. King, Barraport
780	Derby Way ..	5 L.	W. J. McKay, Elsternwick
807	Desert Pos ..	A. L.	T. W. Lane, Euroa
882	Diblitz of Penniwells	A. P.	Mrs. D. Maclean, Yan Yean
..	Diblitz Junior of San Remo	3 P.	R. J. Maclellan, South Yarra
257	Dimboola ..	A. T.	C. A. Rogers, Warrnambool
562	Dinna Forget ..	5 D.	Stepnell Bros., Scotsburn
516	Direct Abdullah ..	A. L.	Mrs. E. C. Gibb, Moolap

* *Note.*—Age in years. A., aged; D., draught; L., light; P., pony; T., thoroughbred.

Stallion Register 1932-33—*continued.*

Cert. No.	Name.	Age* and Class.	Owner and Address.
866	Domination ..	A. P.	C. T. Lucas, Pomborneit
401	Don Alto ..	A. L.	G. Luckie, Springhurst
915	Don Ribbons ..	A. L.	Mrs. H. Hanel, Wodonga
896	Don Salatis ..	A. T.	A. E. Bowman, Bethanga Park
837	Don Swift ..	A. L.	A. Harvey, Berriwillock
65	Donald Dale ..	3 D.	A. Harris, Coolamon, N.S.W.
69	Donalds Best ..	A. D.	A. F. Downie, Donald
871	Donnibristle ..	A. D.	J. G. Wilson, Milawa
602	Double Court ..	A. T.	Pierce and Wheeler, Towong
28	Douglas Chief ..	A. D.	E. G. Treager, Merbein
396	Douglas Patrician	4 D.	T. A. Heard, Noradjuha
649	Drumbaron ..	3 D.	P. J. Cleary, Avonmore
622	Drummer Boy ..	A. D.	E. Swanton, Cravensville
172	Drumry Equipment	A. D.	H. H. Shandley, Mt. Eccles
279	Drumrys Pride ..	A. D.	J. Currie, Balmattum
230	Duddon ..	A. T.	A. P. Wade, Glen Alvie
100	Duke	A. D.	L. G. Short, Cramenton
724	Duke Little Eyes..	A. D.	T. J. Fitzpatrick, Nyah West
854	Duke of Glenmore	3 D.	W. E. Maidment, Sandmount
247	Dukemore ..	A. D.	J. E. Maxwell, Hopetoun
919	Duncan Stewart ..	A. D.	F. G. Fitzpatrick, Heyfield
433	Dunure Dale ..	4 D.	J. Boyle, Watchem
280	Dunira James ..	A. D.	G. H. Allen, Beulah
314	Dunmores Pride ..	A. D.	L. Page, Torrita
384	Dunure Blend ..	A. D.	J. S. Gull, Kenmore
832	Earl Direct ..	A. L.	F. McClelland, Boort
411	Eaton Headlight ..	A. D.	E. W. Schneider, Yulecart
806	Ebony Stamp ..	A. D.	W. J. Robinson, Truganina
510	Eclypse ..	A. D.	C. Hahnel, Walpeup
381	Eclypse of Lauriston	3 D.	C. J. Symes, Walpeup
765	Economist ..	3 D.	Parker Bros., Quambatook
754	El Dorado ..	A. T.	C. E. Hawker, Lillimur
670	Ellerslie Dale ..	4 D.	P. T. Lee, Birchip
478	Ellerslie Willie ..	5 D.	Gowanford Horse Club, Ultima
330	Emerson ..	A. T.	A. S. Blair, Watchem
716	Enterprise ..	A. D.	C. H. Perkins, Rainbow
422	Eskdale Nugget ..	4 D.	T. Lay, Eskdale
487	Ettrick Bankdraft	3 D.	J. Turnbull, Albury
139	Ettrick Dale ..	A. D.	J. Fuzzard, Numurkah
617	Eureka Sensation	3 D.	C. T. Lucas, Colbinabbin
10	Everlasting Dale ..	A. D.	A. E. Cox, Alma
532	Everlasting Simon	3 D.	E. McIlwraith, Myrniong
99	Excelsis Regulus ..	A. D.	W. Pizer, Kyneton
358	Factotum ..	A. D.	J. Richardson, Glenthompson
867	Fairboy ..	5 D.	J. J. Slater, Sale
395	Fairfield Royal Banker	5 D.	R. Carroll, Perth
327	Famous Voyage ..	A. L.	P. A. Beaumont, Ouyen
756	Farleton Bold Record	6 D.	R. Crozier, South Morang
558	Farleton Wave ..	3 D.	J. Davies, Curlewis
107	Farmers Pride ..	A. D.	W. Dixon, Phillip Island
515	Favourite Lad ..	A. D.	C. E. Gomm, Somerville
544	Fenwicks Pride ..	A. D.	O. Bassett, Sandmount
452	Fernbank Craigend	3 D.	H. C. Younger, Greta
427	Fighting Top ..	5 T.	T. Robertson, Kirkstall
27	Fine View Baron Royal	A. D.	W. H. Gibbons, Galah
484	Fine View Elect ..	5 D.	T. Kelly, Minyip
318	Fine View Favour	6 D.	Hehr Bros., Wollert
47	Fine View Premier	6 D.	K. Cameron, Warracknabeal
306	Fine View Print ..	6 D.	G. E. Candler, Hamilton
550	Fine View Squire..	6 D.	H. R. Richards, Trawool
940	First Grattan ..	A. L.	H. D. Adams, Kotupna
371	First Voyage ..	A. L.	W. J. Minns, Melton
563	Flash Bourne ..	4 D.	T. E. Moller, Dimboola
538	Flash Bute ..	A. D.	State Research Farm, Werribee
633	Flash Dunure ..	6 D.	D. J. Bagnell, Mologa
518	Flash of the North	5 D.	P. Bagnell, Mologa
345	Flash Timekeeper	3 D.	Mrs. T. Clarke, Laceby South
290	Flash Trust ..	6 L.	L. O'Connell, Wycheproof
287	Flash Voyage ..	A. L.	C. T. Evans, Rathscar
272	Flashlight ..	4 D.	C. R. Rigby, Hamilton
265	Flashwood ..	5 D.	J. and W. Thomson, Dimboola
682	Foreman ..	A. D.	A. Sutherland, Welshpool
302	Full Power ..	A. T.	W. Fisher, Rainbow
742	Gallant Jock ..	A. D.	S. L. Gordon, Lismore
108	Gallant Kerrston..	6 D.	W. J. Beanham, Lilliput
109	Gallant Lad ..	6 D.	W. Starick, Murtoa
6	Gallant Macarthur	6 D.	T. Nankervis, Diggora South
626	Gay Bold ..	A. D.	Amarant Bros., Wattle Creek
905	Gay Robin ..	A. D.	H. Ingram, Orbost
586	General Foch ..	A. D.	J. W. Sykes, Haysdale
727	General Harvey ..	A. D.	H. E. Byron, Woomelang
171	General Keith ..	A. D.	J. E. Farnell, Eaglehawk
110	Gillies Son ..	A. D.	Boyd Bros., Minhamite
590	Gillingall ..	3 T.	J. Prankerd, Gillingall
481	Glen Ayr ..	A. D.	G. Peters, Eskdale
293	Glen Baron Belmont	4 D.	T. Gilcrist, Rutherglen
971	Glen Cairn ..	A. D.	W. T. Mitchell, Lower Bethanga
599	Glen Dower ..	3 D.	H. McCluskey, Strathmerton
877	Glen Isla ..	A. D.	F. Perry, Corack
390	Glen Major McKie	5 D.	J. W. McDougall, Katandra
577	Glen Newton Dignity	4 D.	W. G. Hall, Talbot
522	Glenburn Laddie..	3 D.	Erbs Bros., Trafalgar
209	Glencairn Rob Roy	A. D.	W. and C. Olliver, Diggora West
689	Glengyle ..	A. P.	C. A. Taylor, Rutherglen
504	Glenmere Craig ..	5 D.	J. Rumbold, Laanecoorie
428	Glenmore's Pride..	5 D.	Lynch Bros., Wilbralong, New South Wales
865	Glenscott ..	A. D.	A. B. Gibbins, Murrabit
567	Globe Pool ..	A. L.	J. Chisholm, Dandenong
938	Globes Image ..	A. L.	J. Ohlin, Gooramadda
281	Gobbler ..	A. D.	M. J. Cahill, Mannibadar
11	Gold Brew ..	A. T.	W. J. Clarke, Dunkeld
705	Golden Simmer ..	A. P.	M. O'Brien, Hamilton
514	Gortland ..	A. T.	Police Department, Melbourne
70	Graculus ..	A. T.	S. Loveridge, Corowa
398	Grand Derby ..	A. L.	D. C. Greig, Melbourne
436	Grand March ..	A. D.	W. M. Hughes, Inglewood
935	Grand Opera ..	6 L.	J. J. Guidice, Kangaroo Flat
140	Great Derby ..	A. L.	L. W. Crapper, Neilborough
826	Great Perswisian..	3 D.	T. Sutherland, Sulky
361	Great Scott ..	3 D.	W. Dunstan, Yatpool
391	Grennan Le Crystal	3 D.	J. D. McNaughton, Moorilim
397	Gum Park Desire	3 D.	Redford and Sons, Gymbowen
847	Hampton Ben ..	A. D.	J. M. Peters, Warracknabeal
385	Hard Times ..	A. D.	D. Murphy, Rochester
781	Harold Pronto ..	A. L.	F. Lawrence, East Melbourne
616	Harry Picture ..	5 L.	Mrs. A. Egan, Rochester
552	Hazeldene ..	3 D.	H. McGregor, Kaniva
24	Heather Jock ..	A. D.	H. Hayward, Skipton
759	Heather Mac ..	A. D.	Fuller and Sprigg, Mitre
231	Herdsmans Treasure	A. D.	W. F. Irvine, Invergordon
60	Hero Bold ..	A. D.	A. T. Creswick, Queensland
974	Hero's Lad ..	A. D.	W. Fowler, Kerang
170	Herward ..	A. D.	H. Wright, Barmah
98	High Honor ..	A. D.	C. H. Feldtmann, Major Plains
114	Hillhead Knight ..	A. D.	Warner and Son, Nhill
533	Hill Park Craig ..	3 D.	D. Rumbold, Baringhup West
337	Hill Park Masterpiece	3 D.	A. W. Watson, Nullawil
336	Hill Park Masterstroke	3 D.	R. J. Jones, Maryborough
620	Hill View Rising Star	4 D.	J. J. Gleeson, Southern Cross
591	Hill View Rising Sun	4 D.	W. A. McClellan, Bungaree
42	Holton	6 D.	Dyke Bros., Gre Gre
814	Homeward Bound	A. L.	D. and J. McCamey, Tinamba
653	Honest Mac ..	5 D.	O. R. Poole, Fenton's Creek
801	Hotspur ..	A. P.	C. Lipplatt, Scotsburn
782	Huon Marvin ..	5 L.	F. G. Missen, Rockbank
673	Ian Again ..	A. D.	C. C. Hawker, Lillimur
551	Ideal Craigie ..	5 D.	C. and N. Ferrier, Birchip
663	Ideal Flashday ..	4 D.	E. M. Thomas, Hopetoun
621	Ideal Roy	5 D.	P. C. Cunnington, Bamawn Extension
492	Ideal Scotsman ..	4 D.	N. E. Miller, Yanac South
494	Ideal Slade ..	3 D.	L. and G. Dalton, Tempy
271	Ideal Viceroyal ..	4 D.	C. and P. McNaughton, Cavendish
348	Interest ..	A. P.	A. Kennedy, Arcadia
260	Irish Boy ..	6 D.	E. Molloy, Towaninny
819	Ironsides ..	A. T.	J. Purss, Walwa
319	Jack	A. D.	W. Fanning, Wyuna East
199	Jack Craig ..	A. D.	W. Sheehan, South Muckleford
900	Jack McKinney ..	A. L.	D. Moriarty, Wee Wee Rup
860	Jack Marsh ..	A. T.	J. F. McDonald, Bacchus Marsh
84	Jack O'Diamonds	A. L.	M. Cramer, Detpa
628	Jack Tar ..	A. D.	R. M. Dinwiddie, Lorquon West

* *Note.*—Age in years. A., aged; D., draught; L., light; P., pony; T., thoroughbred.

Stallion Register 1932-33—*continued.*

Cert. No.	Name.	Age* and Class.	Owner and Address.
831	Jacko	A. D.	D. P. Healey, Salisbury
783	Jacko	A. P.	J. H. Ralph, Murrumbeena
200	James Osterley ..	A. L.	Miss M. Huddleston, Geelong
751	Jock Cedric ..	A. D.	M. McLeod, Condah Swamp
232	Jock MacGregor ..	A. D.	Reseigh and Flockart, Reseigh
18	John Brigham Last	A. P	G. N. Buckley, Wickliffe
349	John Douglas ..	A. D.	L. Norman, Kaniva
667	John Gartland ..	5 D.	G. T. Deckert, Kinimakatka
466	John Shepherd ..	A. D.	A. F. Dahlenbury, Salisbury
407	Justice	A. D.	A. Stanbury, Piangil
362	Jutland Chief ..	4 D.	R. Stanbury, Karawinna
666	Kardella Imprint..	3 D.	Maddern and Sons, Blackheath
169	Kelly	A. P.	Mrs. S. Hemley, Lake Side
800	Kelm Pride ..	A. D.	C. Lippiatt, Scotsburn
160	Kelms Prince ..	6 D.	Nicoll Bros., Hoddle Range
189	Kelmscott II. ..	A. D.	A. R. Yard, Murrayville
185	Kelso Ideal ..	A. D.	E. R. Prater, Berriwillock
679	Kelso Marquis ..	3 D.	A. H. Rathjen, Lindenow
340	Kelso Sensation ..	5 D.	Starritt Bros., North-West Mooroopna
719	Kelvin	A. D.	H. S. Graham, East Malvern
168	Kens Pride ..	A. P.	H. McMeekin, Kyneton
224	Kerrsdale ..	A. D.	E. Wilson, Leongatha
592	Khartoum ..	A. D.	M. J. Bland, South Australia
569	Killawney ..	A. D.	A. J. McRae, Gre Gre North
233	Kilty	A. L.	Langi Kal Kal Estate, Trawalla
193	King Ballance ...	A. D.	F. H. Kennett, Kaniva
97	King Billy ..	A. D.	Malook Singh, Manangatang
277	King Cal ..	A. T.	D. L. Campbell, Merino
278	King Clyde ..	A. D.	R. C. Dennis, Woodglen
939	King Dale ..	A. D.	P. Glenane, Ballarat
264	King Douglas ..	4 D.	W. C. Bothe, Arhona
48	King Heedless ..	A. T.	J. Manifold, Weerite
470	King Herod ..	4 D.	Gregory and Newton, Moama
188	King John ..	A. D.	J. D. Potter, Green's Creek
924	King Victor ..	A. D.	W. S. Clarke, Laceby South
350	King of the Roses II.	A. D.	M. McGillivray, Bold Rock
96	Kings Own ..	A. D.	R. E. Nichols, Merbein West
755	Kings Pride ..	A. D.	J. Rose, Pakenham
547	Kings Prize ..	A. D.	J. L. McErvale, Brewster
359	Kings Star ..	5 D.	Boord Bros., Yarrara
311	Kinlock Hero ..	6 D.	F. H. Baker, Jung
7	Kirkcaldy Baron Bold	3 D.	T. Clark, Mt. Gambier
555	Korongah Bold Kerrston	3 D.	R. L. Henderson, Burrumbeet
405	Korongah Bold Master	3 D.	G. Oxley, Gre Gre North
50	Korongah Craigwillie	A. D.	K. Cameron, Warracknabeal
813	Lackamore ..	A. L.	W. R. Cahill, Kyabram
240	Lancashire Chief..	A. D.	J. Wisneske, Linga
507	Lancashire Lad ..	A. D.	J. E. Carter, Addington
772	Langdale ..	A. D.	M. Donnellan, Jeffcott North
581	Lansdale Everest..	A. D.	E. McKoy, Wodonga West
167	Lavereen Prince Buchlyvie	A. D.	J. Leitch, Wodonga West
71	Lawrence Drew ..	6 D.	W. Wheelhouse, Wehla
687	Leapfrog ..	A. L.	F. Funcke, Laen
887	Lee Creek Squire..	A. D.	L. J. McConachey, Kariah
965	Leonard Dale ..	A. D.	D. McDonald, Myrniong
203	Lieutenant ..	A. D.	McQueen Bros., Waubra
702	Liston Duke ..	5 D.	C. S. Rodda, Warracknabeal
434	Little Brigham ..	A. P.	W. I. Greenaway, Beazley's Bridge
377	Little Comet ..	A. P.	F. Hoystead, Wangaratta
234	Little Eumarrah ..	A. P.	R. Painter, Leaghur
256	Little Welshman ..	A. P.	J. Cameron, Timor West
615	Loch Garry Craig	3 D.	McDonald Bros., Rochester
235	Lochaber ..	A. L.	H. Watson, Ross Creek
584	Lochend ..	3 P.	H. Coverdale, Bairnsdale
568	Lochinvar ..	A. P.	R. L. McRae, Warracknabeal
553	Loddon Lea Sundial	3 D.	R. McDonald, Mannerim
332	Lord Aldie ..	A. D.	R. T. Redenbach, Tambo Upper
726	Lord Allen ..	A. D.	T. Bull, Ultima
528	Lord Avon ..	3 D.	J. Foley, Llowlong
249	Lord Baron ..	6 D.	W. Merritt, South Australia
150	Lord Belmont ..	A. D.	W. K. Stokes, Riddell
286	Lord Cedric ..	A. D.	W. J. Currell, Cowley's Creek
257	Lord Fabric ..	A. D.	E. T. Bail, Torrumbarry
927	Lord Graculus ..	4 L.	J. Montgomery, Milawa
942	Lord Huntly ..	A. D.	McCrae and Thornton, St. Albans
501	Lord Marvin ..	4 L.	C. Adcock, Watchupga
58	Lord Moray ..	A. D.	H. Crump, Koyuga
296	Lord Remarco ..	A. T.	B. L. Mulraney, Kaniva
540	Lord Threave ..	A. D.	O. Gaulke, Tarranyurk
699	Lost Time ..	A. T.	J. E. McBurnie, Malvern
730	Lucky Boy ..	A. D.	Graham Bros., Bacchus Marsh
721	Lue Ribbons ..	A. L.	A. McLeod, Stawell
320	Lymm Truffle 2nd	A. D.	A. E. Sanders, Miram
643	Lymm Loden ..	A. D.	A. F. Emery, Tarnook
791	Lyndale ..	A. D.	W. Rutherford, Nandaly
115	Lyndhurst ..	A. D.	W. L. Roberts, Hopetoun
338	Lyndhurst Craigie	5 D.	H. L. Walter, Tatura
472	Lyndhurst Master Craig	3 D.	J. F. Delahunty, Murtoa
503	Lyndhurst Oarsman	4 D.	A. Arnold, Warracknabeal
205	Lyndhurst Radiant	6 D.	W. Robinson, Armstrong
930	Lynson	A. P.	— Wilson, Newstead
450	Mac	3 D.	E. O. Manuel, Kerang
493	Macs Pride ..	3 D.	Miss E. Hymers, Tempy
648	Macs Worthy ..	4 D.	E. Wilson, Llanelly
194	Macedon Hero ..	A. D.	McKenzie and Nasebandt, Locksley
83	McKenna of Shetland Heights	A. P.	W. E. Clinton, Heidelberg
373	McLeish ..	A. D.	McLeod Bros., Yarram
904	Magic Railway ..	A. P.	C. E. Wilkin, Ashburton
206	Major Again ..	A. D.	H. Brown, Minyip
937	Major Clyde ..	A. D.	M. J. Grogan, Donald
124	Major Douglas ..	A. D.	A. E. Dahlenburg, Winiam East
477	Major Drumcross..	4 D.	L. Kossatz, Netherby
587	Major Dundonald	5 D.	A. McInnes, Bundalong South
187	Major Lee ..	A. D.	E. T. Menzel, Bellbrae P.O.
804	Major Mac ..	A. D.	H. Henderson, Barraport
180	Major Willie ..	A. D.	J. H. Reichelt, Ni Ni Well
596	Mallee Chavalier ..	A. D.	J. Cobain (jnr.), Sale
961	Malt Lawn ..	A. L.	J. J. Sherry, Morwell
521	Maori Bold ..	3 D.	D. McKinnon, Beazley's Bridge
876	Maori Jack ..	A. D.	A. Potter, Naroghid
595	Marcellus II. ..	A. D.	Forrest Bros., Port Fairy
808	March	3 L.	J. Kinnimonth, Mt. Hesse
710	March Along ..	A. D.	H. Carr, Manangatang
125	Marchfield ..	A. D.	J. Skelly, Echuca
111	Marcus Junior ..	A. L.	Blair Bros., Lara
917	Maritimus ..	A. D.	T. J. Opie, Kyneton
546	Mark Hazel ..	A. P.	J. McMahon, Smoko
728	Mark Twain ..	A. D.	Mrs. E. Smith, Lalbert
739	Marquis Bold ..	A. D.	C. W. Webb, Kurting
923	Marquis Dundonald	A. D.	C. H. Fisher, Kenley
958	Marshall Clyde ..	A. D.	D. McFarlane, Birchip
211	Marvell of Earlshall	A. P.	R. J. Maclellan, South Yarra
722	Master Brook ..	A. L.	A. Beattie, Tungamah
258	Master Comedy ..	A. P.	A. D. Thompson, Wyuna
441	Masterdale ..	A. D.	F. Kerr, Yeoburn East
239	Masterpiece ..	A. D.	A. Cheesley, Barnawartha
537	Masterstroke ..	5 D.	H. Parish, Winchelsea
270	Mastertone ..	4 D.	W. H. Mitchell, Sandford
351	Maurite ..	A. L.	O. S. Ovens, Cooma
292	Maydale Christie ..	3 D.	King and Sons, Rutherglen
647	Mayfield ..	3 D.	D. Trewick, Elmore
703	Melrock Flash Viceroy	4 D.	Todd Bros., Beulah
310	Melrock Prince Dale	6 D.	J. W. Scott, Katyil
382	Melrock Roy Dale	A. D.	J. A. Todd, Beulah
432	Meltons Trust ..	3 T.	J. Moran, Watchem
706	Meredin ..	A. D.	T. Rogers, Koroop
201	Merry Prince ..	A. D.	B. Rogers, Mepunga East
650	Merry Prince ..	3 D.	G. Pearse, Nyah
912	Mid-day ..	A. P.	J. Bannam, Wallacedale
19	Middlerigg Referee	A. D.	A. Beckett, Underbool
773	Midnight Voyage..	6 L.	J. Buchanan and Sons, Rochester
817	Mikado	A. L.	A. G. Turnbull, Winnieburn
255	Milton Huon ..	A. L.	C. E. Burkinshaw, Wareek
236	Miniature ..	A. P.	T. Robertson, Macarthur
141	Model Bute ..	A. D.	Hansen Bros., Barnawartha
691	Mont Harold ..	A. L.	Mrs. Sanders, Cramenton
864	Montrose ..	A. D.	E. D. Watson, Wycheproof
764	Moorabool Pride ..	4 P.	J. S. Thompson, Little River

* *Note.*—Age in years. A., aged; D., draught; L., light; P., pony; T., thoroughbred.

STALLION REGISTER 1932-33—*continued.*

Cert. No.	Name.	Age* and Class.	Owner and Address.
12	Moredun Baron ..	A. D.	Mrs. F. Tilley, Port Fairy
237	Moredun Ranger ..	A. D.	W. Hodges, Macarthur
560	Morning Prince ..	3 D.	J. Draper, Yan Yean
212	Morocco Lad ..	A. D.	Mrs. E. Parish, Green Park
514	Mundoona Bold Craig	3 D.	A. McMaster, Dargalong
827	Napoleon ..	A. D.	S. J. Lewis, Baringhup
23	Nariel Banker ..	3 D.	R. Carroll, Perth
640	Naseby Flashmore ..	5 D.	E. Hancock, Aubrey
82	Nelson Chief ..	A. D.	W. Robinson, Armstrong
774	Nether Craigends ..	A. D.	Davies and Buchanan, Rochester
561	Netherha Factor ..	3 D.	J. B. Ferguson, Waubra
707	Netherhall ..	A. D.	J. G. Bunworth, Donald
696	New Derby ..	6 L.	L. J. King, Quambatook
62	Newfields Ambition	4 D.	R. Carroll, Perth
166	Newfields Pride ..	A. D.	R. J. Baldwin, Gre Gre South
72	Newton Banks ..	A. D.	J. R. Morrison, Woorlwyrite
856	Newton Lad ..	3 D.	F. W. Murphy, Murphy's Lake
952	Newton Style ..	A. D.	L. McConachy, Kariah
816	Newtons Moddle ..	A. D.	C. W. McClay, Lake Boga
186	Newtons Pride ..	A. D.	G. Crabbe, Colac
429	Nilpena ..	3 T.	F. C. Coy, Lismore
403	Nimitybelle Mac ..	5 D.	H. Chessals, Youanmite
334	Nivek	A. P.	J. Curracan, Nagamble
300	Noble Glen ..	A. D.	E. J. Noske, Tarrington
151	Non Pareil ..	A. D.	J. Roberts, Calder's Bag
495	Noralunga Royal-slade	3 D.	A. Kellet, Melbourne
735	Norvals Elect ..	3 D.	J. McEncroe, North Melbourne
372	Nutshell ..	A. P.	Miss D. Robertson, Hamilton
638	Oakdale Dignity ..	3 D.	Stephan Bros., Wail
241	Oaklyn Mac ..	6 D.	W. Marke, Girgarre
662	Oarsman ..	3 D.	T. Parker, Pepper's Plains
683	Ochtertyre Radiant	4 D.	C. P. Peterson, Kellalac
885	Ochtertyre Widgiewa	3 D.	D. Ervin, Central Mologa
369	Onward ..	6 D.	W. Bean, Sale
920	Onward Baron Belmont	A. D.	J. F. Wells, Wodonga
752	Onward Star ..	A. D.	R. Williams, Dunbulbalane
609	Oora Park Onward	3 D.	D. Chisholm, Swan Hill
936	Opera Boy ..	A. L.	J. Guidice, Kangaroo Flat
891	Oscar Siam ..	A. L.	H. Fehring, Cohuna
829	Othon	A. P.	P. Peters, Tungamah
582	Overdale ..	4 D.	H. Metherall, Warracknabeal
758	Overdue ..	3 D.	T. Bagnell, Yarrawalla
855	Overland ..	3 D.	F. A. Tonissan, Moutajup
22	Overslade ..	A. D.	C. S. Rodda, Warracknabeal
530	Overson ..	3 D.	McFarlane Bros., Anakie
753	Oxford	A. D.	S. T. and N. C. Capron, Lethbridge
339	Parlewidgee Utility	3 D.	J. Maher, Tatura
126	Patriotic ..	A. D.	C. Carra, Hopetoun
757	Patrus	A. T.	O'Brien and Nolan, Culgoa
13	Pearlyn ..	A. L.	F. W. Bowden, Won Wron
213	Pedlar	6 D.	McQueen Bros., Waubra
588	Pedro Chief ..	4 L.	A. D. McLennan, Derrinal
352	Periscope ..	A. L.	J. and M. Ervin, Pyramid
426	Peterdale ..	5 D.	J. H. Walder, Watchem
142	Pettadale ..	A. D.	B. Malone, Leichardt
491	Pineholm Baron ..	3 D.	J. T. Judd, Yanac
574	Pine Lea Belmont Print	4 D.	Sewell Bros., Smeaton
554	Pine Park Premier	3 D.	Cantwell Bros., Meenlyan
152	Playfair	A. D.	Cadzow Bros., Wolfton
928	Pocket Edition ..	A. P.	Mrs. T. M. Clark, Laceby South
686	Poilu	A. P.	Cross Bros., Minimay
363	Post Boy ..	4 D.	B. Bailey, Werrimul
542	Predomino ..	5 D.	Kelly and Co., Caramut
471	Premier Prince ..	3 D.	C. H. Schultz, Murtoa
238	Present	A. P.	W. H. Oats, Mansfield
324	Pride Darnley ..	A. D.	E. Boschert, Tempy
784	Pride of Didyme ..	3 P.	G. Brough, Cheltenham
81	Pride of the Lake	A. T.	R. F. Blake, Green Lake
489	Prince Abbot ..	5 D.	R. A. Walter, Warragamba
304	Prince Alexander II.	6 D.	L. J. McDonald, Winchelsea
892	Prince Buchlyvie ..	A. D.	G. W. Pennel, Braybrook
64	Prince Dale ..	A. D.	Downey and Son, Wallace
273	Prince Dignity ..	4 D.	J. V. Haggblom, Sea Lake
835	Prince Ecuador ..	A. T.	F. Hender, Broomfield
614	Prince Gay ..	4 D.	P. D. Richards, Cramenton
964	Prince Harold ..	A. P.	Mrs. M. E. Robertson, Wallacedale
500	Prince Imperial ..	3 D.	A. Collins, Watchupga
883	Prince Que ..	A. P.	J. H. Bromley, Mitcham
259	Prince Wallace ..	5 D.	J. Pole, Nullawil
823	Prince Wigton ..	A. D.	W. Studman, Bairnsdale
143	Quarrington Lad ..	A. D.	W. Filby, Kamarooka
51	Quattas Belmont ..	A. D.	M. Lindsay, Staghorn Flat
589	Rafa	5 P.	A. M. Pearson, Omeo
365	Ranfurly's Pride ..	4 D.	G. Stone, Daalka
641	Ranor	3 L.	J. V. Haggblom, Sea Lake
34	Raseel	A. L.	Mrs. A. D. Maclean, Yan Yean
661	Real O.K. ..	A. D.	J. M. Taylor, Shepparton
600	Rear Admiral ..	6 L.	H. C. Baker, Stanhope
970	Recompense ..	3 D.	A. Dahlenburg, Winiam East
435	Red Lion ..	A. P.	J. W. Ewing, Penshurst
737	Reflection ..	3 D.	J. Burns, Euroa
862	Resolution ..	A. D.	Miller Bros., Bacchus Marsh
328	Review	A. D.	A. E. Barbary, Woomelang
499	Rexdale ..	5 D.	Mrs. H. B. Canard, Lascelles
881	Right Dale ..	A. L.	J. G. Graves, Mansfield
502	Rising Dawn ..	3 D.	E. Ervin, Brim
412	Rising Sun ..	A. D.	J. O'Bree, Piangil
467	Robert Bruce ..	A. D.	H. Gregerson, Benalla
424	Robin Adair ..	3 D.	H. Gordon, Willaura
897	Robinhood ..	A. D.	J. McKee, Clarendon
80	Rocket	A. P.	A. W. Thomson, Hamilton
921	Roma Dale ..	6 D.	Mrs. K. V. Kendall, Charlton
267	Rosalinds Pride ..	5 D.	G. F. Coles, Mittyack
898	Rose of Rexworth's Pride	A. D.	J. Lang, Bangerang
378	Rosedale I. ..	A. D.	G. T. Werner, Jeparit
165	Rosedale II. ..	A. D.	C. J. Liesfield, Rainbow
907	Roseneath Baronet	A. D.	J. H. Fuge, Ruthergien
276	Roseneath Craig ..	3 D.	W. Thornton, Berrigan, New South Wales
275	Roseneath Ivan ..	3 D.	Kronborg and Carless, Thoona
968	Roseworthy ..	A. L.	E. Allen, Ondit
526	Rossendale ..	4 P.	E. Allen, Ondit
973	Rostrata ..	5 L.	K. Urquhart, Hexham
218	Roy	A. P.	J. B. Cleeland, Newhaven
762	Royal	A. D.	R. N. Dunn, Rupanyup
583	Royal Bellman ..	A. D.	A. A. Johns, Horsham
75	Royal Belmont ..	A. D.	W. A. Creighton, Molesworth
289	Royal Bold ..	3 D.	E. McNaughton, Wycheproof
367	Royal Boy ..	3 D.	H. R. Weir, Ouyen
723	Royal Brigham ..	A. P.	Hinkley and Sons, Warrion
400	Royal Bute ..	A. D.	G. Luckie, Springhurst
335	Royal Captain ..	5 D.	G. H. Nunn, Tiega
824	Royal Chief ..	A. D.	B. Mulraney, Kaniva
669	Royal Comedy ..	A. T.	E. C. Amor, Yarram
95	Royal Dale ..	A. D.	L. Hill, Lake Bolac
52	Royal Dale ..	A. D.	C. Fuller, Linga
665	Royal Douglas ..	4 D.	Voight Bros., Nhill
183	Royal Douglas ..	A. D.	Executors of the estate of the late J. Dugdale, Myrniong
718	Royal Duke ..	A. D.	M. J. O'Brien, Hamilton
295	Royal Enterprise ..	4 D.	G. H. Powell, Lillimur
841	Royal Fashion ..	3 D.	C. R. Sprake, Murtoa
437	Royal Fashion ..	A. D.	F. Shaw, St. Arnaud
840	Royal Gartley II.	A. D.	J. McCormack, Roseberry East
870	Royal George ..	A. P.	S. O. Wood, Nagambie
261	Royal Hero ..	A. D.	Carroll Bros., Dandenong
692	Royal Hiawatha ..	A. D.	A. and H. Pitcher, Tatyoon
220	Royal Kelm ..	6 D.	Mrs. M. Alexander, Glenloth
73	Royal Kerrston ..	A. D.	F. Hamilton, Coonooer Bridge
214	Royal King ..	A. D.	C. E. Pencker, Nandaly
625	Royal Mac ..	4 D.	A. Coe, Balliang
182	Royal McGregor ..	A. D.	L. J. Martin, Ultima
675	Royal Monarch ..	3 D.	L. E. McKenzie, Ariah Park, New South Wales
127	Royal Peter ..	A. D.	R. E. Hanson, Fern Hill
59	Royal Prince ..	6 D.	T. F. Hetherton, Piangil
364	Royal Redman ..	4 D.	E. McCabe, Underbool
646	Royal Rodney ..	4 D.	S. Cheatley, Elmore
79	Royal Scotch ..	A. D.	F. Henke, Boolite
112	Royal Sunbeam ..	A. D.	B. D. G. McIlraith, Massey
181	Royal Top ..	A. P.	C. McKebery, Coleraine
742	Royal View ..	A. D.	A. Wohler and Werner Bros., Winiam
184	Royalty ..	A. P.	H. Redford, Nurcoung
513	Sacedon ..	A. T.	Police Department, Melbourne
884	Sam Huon ..	A. L.	Miss E. O'Brien, East Melb.
288	Sam Mack ..	3 L.	A. Cheesley, Barnawartha
94	Sampson ..	A. D.	W. Bingham, Thorpdale

* *Note.*—Age in years. A., aged; D., draught; L., light; P., pony; T., thoroughbred.

Stallion Register 1932-33—*continued.*

Cert. No.	Name.	Age* and Class.	Owner and Address.
93	Sandys Fashion ..	A. D.	F. T. Hemley, Glenorchy
321	Santa Claus ..	A. P.	W. C. Greaves, Monomeith
222	Santrel	A. T.	W. Irvine, Invergordon
346	Scotch Bells ..	A. P.	S. Sanders, Brentwood
566	Scotch Ben ..	3 D.	W. C. Rothacker, Pompapiel
449	Scotch Crown ..	A. D.	L. Yoxon, Narrung
421	Scotch Dale ..	A. D.	W. Tucker, Horsham
536	Scotch Drumry ..	5 D.	W. G. Young, Neerim
128	Scotch Laddie ..	A. D.	E. Smith, Lilliico
914	Scotch Mixture ..	A. D.	W. Hibbins, Springfield
468	Scotch Prince ..	A. D.	Evans Bros., Redcamp
632	Scotch Thistle ..	A. D.	W. Gray, Yarrawalla South
776	Scotchie ..	A. D.	I. Kelly, Korong Vale
809	Scotland Again ..	A. D.	J. Mulholland, Eurobin
799	Scotland Again ..	A. D.	A. McDonald, Mt. Wallace
380	Scotland for Ever	A. D.	S. Rogers, Rainbow
414	Scotlands Cavendale	3 D.	W. V. Spehr, Rendlesham
53	Scotlands Dignity	A. D.	J. H. Meyer, Kaniva
833	Scotlands Viceroy's First	A. D.	T. W. Thomas, Culgoa
821	Scotlands Victor ..	A. D.	W. Bartlett, Stratford
457	Scottish Banker ..	A. D.	G. L. Byrne, Kewell North
274	Scottish Baron ..	4 D.	Miners Bros., Sea Lake
92	Scottish Chief ..	A. D.	E. J. Wilson, Cheshunt
732	Scottish King ..	A. D.	W. Hall, Lindenow
803	Scottish Laird ..	A. D.	M. J. Rogers, Natimuk
664	Scottish Premier ..	5 D.	M. Pannowitz, Diapur
636	Scotty	A. D.	A. T. Hamblin, Toolleen
420	Sedalia Douglas ..	3 D.	H. E. Giddings, Kalkee
794	Selkirk	A. T.	J. W. Lees, Diggora South
113	Several	A. T.	J. E. Light, Quantong
476	Shadow King ..	3 D.	V. O. Frost, Netherby
393	Shepherd Again ..	A. D.	A. E. Bennett, Cowangie
693	Shepherd King ..	A. D.	Miller Bros., Glenloth East
416	Shepherd Lad ..	A. D.	P. McPartland, Boosey
353	Shepherds Boy ..	A. D.	A. Broom, Neereman
301	Silver King ..	5 P.	A. E. Heard, Numurkah
25	Silver Prince ..	4 D.	W. McDonald, Wharparilla North
408	Simons Son ..	A. D.	T. A. Nicholson, Campbelltown
1	Simulium ..	6 T.	W. Beard, Benalla
593	Sir Armadale ..	A. D.	W. Lange, Mannerim
676	Sir Bute ..	A. D.	A. McInnes, Boisdale
613	Sir Craig ..	5 D.	N. R. Pitts, Merrigum
438	Sir Dillon ..	A. L.	W. Arthur, Kaniva
694	Sir Douglas ..	4 D.	J. K. Corcoran, Amphitheatre
594	Sir Douglas Haig ..	A. D.	J. Lincoln, Portarlington
565	Sir Dudley ..	A. L.	J. W. Trask, Warncoort
164	Sir George Robin ..	A. D.	H. S. Maddern, Serviceton
448	Sir George ..	A. P.	J. K. Russell, Hesse
153	Sir Morley ..	A. P.	P. A. Sinnott, Ensay
294	Sir Percy Northcote	4 D.	Kennett Bros., Kaniva
215	Sir Prince Argos ..	A. D.	M. A. V. McLean, Baring North
246	Sir Richard III. ..	A. P.	W. Henderson, Grasmere
447	Sir Royal Charm ..	A. D.	W. B. Monaghan, Speed
834	Sir Rupert ..	A. D.	N. West, Corop
674	Sir Walter Burnside	A. D.	F. Schroeder, Carinya
446	Slip Knot ..	A. D.	J. K. Russell, Hesse
162	Soldier Boy of Fenwick	A. P.	Miss S. Robinson, East Malvern
543	Southerton Le ..	4 L.	Jos. Hegarty, Turriff
344	Spelthorne ..	A. T.	H. F. Hoystead, Wangaratta
383	Spenagues Baron ..	5 D.	G. Robinson, Warrenbayne
354	Sportsmans Hero ..	A. D.	A. Kennedy, Arcadia
399	Springbank Lawrence	A. D.	W. H. Crawford, Hamilton
874	St. Aidan ..	A. L.	M. Cribbes, Faraday
217	St. Carwyne ..	A. T.	E. Bromley, Tungamah
154	St. Chad ..	6 T.	B. P. Brady, Gooram
523	St. Ninians Craigends	5 D.	E. R. Morton, Drouin
880	St. Simon ..	A. D.	G. J. Butler, Carisbrook
793	Stanley Cicero ..	A. D.	M. McNamara, Undera
604	Starville ..	A. T.	R. J. Cook, Coromby
402	Stirling Craig ..	4 D.	A. W. Groves White, Rushworth
455	Stirling Lad ..	3 D.	D. I. Trewick, Elmore
857	Straight Argot ..	A. L.	Mrs. D. Barry, Geelong
714	Straightaway ..	A. L.	Mrs. N. Sterritt, Ballarat
54	Strathkellar Radiance	6 D.	L. Price, Condah Swamp
144	Stryver	A. D.	H. McCluskey, Strathmerton
645	Stylish Cleve ..	A. L.	F. Reaper, Barham
954	Stylish Kennedy ..	A. D.	D. Revitt, Cobram
538	Stylish Tennessee	5 L.	N. B. Holbert, Mitiamo
715	Stylish Top ..	4 L.	L. J. Bastow, Inglewood
374	Sunbourns Chief ..	A. D.	G. H. Stray, Tabilk
929	Sudbourns Victory	A. D.	V. A. Hicks, South Melbourne
534	Sunnydale ..	4 D.	J. Egan, Leichardt
644	Sunnylands Craig Fashion	3 D.	T. H. Payne, Kilmore
268	Sunnyside Norseman	3 D.	A. E. Buerckner, Tungamah
462	Surrydale ..	6 D.	J. A. Hinton, Vite Vite North
785	Taffy	A. P.	W. G. Miller, Yanac
221	The Cavalier ..	A. D.	J. Henderson, Baulkamaugh North
78	The Count ..	A. P.	A. M. Thomson, Hamilton
642	The Crown ..	A. D.	W. B. McIntosh, Ellam
570	The Dux ..	A. D.	J. Hargreaves, Dederang
366	The Gums Masterdale	5 D.	C. Carter, Karawinna
179	The Night Patrol ..	A. L.	W. C. Holmes, Rainbow
969	The Standard ..	A. D.	J. Forsyth, Murrayville
445	The Toff ..	A. P.	J. Widdis, Flynn
873	Thornfield Craig ..	A. D.	E. J. Leeder, Cope Cope
777	Thornley Master Clyde	6 D.	G. A. McNabb, Irrewillipe East
963	Thoughtful ..	A. P.	J. A. E. Rippon, Cororooke
155	Timely Direct ..	A. L.	J. M. Cromie, Bangholme
517	Tiny Tim ..	5 P.	S. R. Winterbottom, Mincha
459	Titanic	A. P.	A. Young, Mooroopna
77	Toby	A. P.	A. W. Thomson, Hamilton
115	Tommy Dodd ..	A. P.	Boyd Bros., Minhamite
116	Top Score ..	A. D.	J. W. Fenton, Kerang
161	Tressayr ..	A. T.	F. Widdicombe, Gymbowen
202	Trevallyn Baron Dale	A. D.	M. McLeod, Condah
417	Trevallyn Baron Hugo	3 D.	F. H. Baker, Jung
529	Trelawney's Pride	A. D.	P. D. Cattanach, Ouyen
608	Tremenheere Star	3 D.	S. J. Taylor, Lake Boga
117	Trimmer ..	A. D.	J. Attwood, Cashmore
769	Tripos	A. T.	G. Bowman, Mt. Hooghley
308	True Blue ..	A. D.	W. J. Wilson, Drik Drik
869	True Scotch ..	A. D.	F. Sutton, Gredgwin
419	United Scotch ..	3 D.	L. G. Molyneaux, Dooen
444	Valetta Archies Honour	6 D.	Mrs. E. Heenan, Harrow
506	Valetta Barons Mac	6 D.	G. Gray, Branxholme
418	Valetta Chief ..	4 D.	F. H. Baker, Jung
440	Valetta High Honour	4 D.	T. R. Gilmour, Cope Cope
178	Vanquisher ..	6 D.	Jos. O'Bree, Swan Hill
208	Verdale Robin ..	3 D.	R. L. Dahlenburg, Klata
21	Viceroy Favourite	A. D.	W. Harris, Garvoc
811	Vice Royal ..	A. D.	C. S. Walker, Swan Hill
652	Victoria Biologist	3 D.	Woods Bros., Epping
651	Victoria Botanist ..	4 D.	W. Henderson, Grasmere
519	Victoria Court Jester	3 D.	A. S. Anderson, Nambrok
585	Victoria Dancer ..	3 D.	A. Ralston, Lucknow
36	Victoria Epic ..	3 D.	W. H. Wilson, Flowerdale, Tasmania
821	Victoria Goblin ..	3 D.	G. W. Salter, Garfield
624	Victoria Highlight	3 D.	F. and H. Griffiths, Balliang East
486	Victoria Major Wigton	4 D.	D. I. Gibson, Lismore
520	Victoria Northern Light	4 D.	H. Millar, Fulham
343	Victoria Prince Norval	4 D.	W. Munro, Gapsted
37	Victoria Regard ..	3 D.	H. S. Maddern, Serviceton
525	Victoria Solid Stamp	5 D.	W. J. Eades, Colac
360	Victoria Vague ..	3 D.	Mrs. H. S. McEwen, Boonoonar
118	Vin Direct ..	A. L.	J. D. Mulfahey, Windsor
119	Vue Dale ..	A. D.	N. W. Quick, Mollonghip
623	Vue Dales Laddie	3 D.	H. Jenz, Bacchus Marsh
119	Vulcan	A. P.	Boyd Bros., Minhamite
333	Waikoura ..	A. D.	H. M. Parkin, Lower Norton
902	Waironga Clyde ..	A. D.	R. S. Fraser, Jil Jil
157	Waituna ..	A. D.	S. A. Greaves, Berwick

* *Note.*—Age in years. A., aged; D., draught; L., light; P., pony; T., thoroughbred.

STALLION REGISTER 1932-33—*continued.*

Cert. No.	Name.	Age* and Class.	Owner and Address.
394	Waldens Drumcross	4 D.	C. Block, Goroke
177	Wallace Dale ..	A. D.	W. J. Dixon, Donald
473	Wapilly ..	5 T.	W. D. McKebery, Coleraine
355	War Lord ..	A. D.	T. Attenborough, Poowong North
745	Warrender Craig..	4 D.	N. Lang, Warracknabeal
895	Wee Charles ..	A. P.	W. Forster-Woods, Melbourne
322	Wee Charlie ..	A. P.	P. H. Lock, Werribee
252	Wee Jim ..	6 D.	W. Leaf, Waaia
14	Wee Key ..	A. P.	W. J. Clark, Dunkeld
176	Welsh Flyer ..	A. L.	P. J. Reid, Milawa
549	Werndew Golden Footprint	6 D.	C. H. Perkins, Rainbow
458	Western Lad ..	A. D.	G. Welby, Streatham
415	Westphalia Hero..	3 D.	F. Funcke, Laen
175	White Prophet ..	A. T.	L. R. Clarke, Newstead
637	White Socks ..	3 D.	W. L. Tippetts, Annuello
740	White Star ..	A. L.	G. Cruse, Bamawm
490	Widgies Hero ..	3 D.	W. Magrath, Yanac South
130	Widgiewa Alick ..	A. D.	Manager Barragunda Estate, Melbourne
74	Widgiewa Belmont	A. D.	J. A. Roberts, Willenabrina
906	Widgiewa Black Diamond	A. D.	A. H. Hooper, Dookie
890	Widgiewa Blackwood	A. D.	W. S. Foster, Keysborough
843	Widgiewa Cavalier	A. D.	A. G. Gordon, Broughton
26	Widgiewa Edward	A. D.	W. G. Down, Koonda
792	Widgiewa Fashion	A. D.	J. Price, Mologa
245	Widgiewa Glancer	A. D.	A. Creighton, Tungamah
129	Widgiewa Ivan ..	A. D.	J. R. McKenzie, Pinnaroo
631	Widgiewa Intent..	A. D.	F. A. McRae, Wallup
580	Widgiewa Ivo ..	A. D.	E. McKoy, Wodonga
76	Widgiewa Knight	A. D.	A. Miller, Parkes, N.S.W.
91	Widgiewa Lebbeus	A. D.	A. Muir, Picola North
606	Widgiewa Mack ..	4 D.	Hawkins and Son, Tocumwal, N.S.W.
598	Widgiewa MacRobertson	3 D.	H. S. McFarlane, Annuello
90	Widgiewa Mark ..	A. D.	C. H. James, Quambatook
463	Widgiewa Ninian..	A. D.	W. Robertson, Lake Boga
75	Widgiewa Norseman	A. D.	Wilkinson and Young, Yarrawonga
749	Widgiewa Norval	A. D.	J. V. Trethowan, Rockbank
746	Widgiewa Sapper	A. D.	L. Little, Stradbroke
120	Widgiewa Stephen	A. D.	Hewitt and Sons, Werrigar East
505	William Wallace ..	A. D.	J. Cumming, Underbool
244	Willie Belmont ..	A. D.	J. S. P. Allen, Broughton
263	Willie Craig ..	A. D.	A. T. Leishman, Kingston
747	Willie McBride ..	A. D.	A. Holmberg, Hunter South
262	Wimmera Success	5 D.	McFarlane Bros., Berriwillock
498	Winsome Banker..	5 D.	E. F. Arthur, Warracknabeal
•253	Winsome Chief ..	A. D.	Westendorf Bros., Dimboola
389	Woodland Footprint	3 D.	D. Holden, Strathmerton
20	Woorgun ..	A. T.	A. E. Herrmann, Dimboola
207	Woorilla Gay Bold	6 D.	A. J. Gloster, Underbool
575	Worawingeth Dignity	3 D.	A. T. Leishman, Kingston
248	Worthy Footprint	A. D.	W. G. Ballantine, Cosgrove
406	Worthy Prince ..	4 D.	A. Kennedy, Arcadia
967	Wunnamurra Flash Baron	5 D.	A. C. Jorgenson, Katyil
54	Wunnamurra Imprint	6 D.	E. McMartin, Yanac
423	Wunnamurra O'Grady	4 D.	J. Galloway, Majorca
388	Wunnamurra Silverstroke	A. D.	J. Wills, Cowangie
916	Xantho	A. T.	J. C. Whitehead, Minhamite
559	Yantara Silverdale	5 D.	A. Kellet, Melbourne
805	Young Badaween	A. P.	A. Baensch, St. Arnaud
564	Young Banjo ..	4 P.	W. J. Greaves, Lyndhurst
413	Young Bannockburn	4 D.	J. Fisher, Pimpinio
480	Young Caesar ..	A. P.	R. Brindley, Guy's Forest
316	Young Clyde ..	A. D.	F. Walsh, Lancefield
156	Young Clydeside ..	A. D.	F. Harrington, Bulga
251	Young Dan ..	A. D.	J. V. Haggbloom, Sea Lake
825	Young Degree ..	A. D.	L. Greenbank, Snake Valley
404	Young Experiment	3 D.	J. T. Jones, Wilby
297	Young Flashlea ..	4 D.	A. Rissman, Tarrington
524	Young Foreman ..	3 D.	G. S. Fraser, Ellinbank
708	Young Harperland	5 D.	W. E. Hards, Meringur
219	Young Ki Ki ..	A. P.	T. Robertson, Macarthur
889	Young Lad ..	A. P.	W. H. Gillett, Drouin
305	Young Linkwood..	A. D.	J. W. Cottrell, Quambatook
250	Young Lymney Champion	A. D.	W. H. Penaluna, Boolarra
913	Young McLeish ..	A. D.	J. Charlton, Stony Creek
839	Young Middlemarch	A. D.	R. McKenrie, Pullut
243	Young Sapper ..	A. D.	H. White, Cowangie
828	Young Starling ..	A. L.	W. Regan, Moonee Ponds

* *Note.*—Age in years. A., aged; D., draught; L., light; P., pony; T., thoroughbred.

Sheep Nasal Bot (*Continued from page* 195.)

usual amount of food, nor to rest contentedly; these factors thus prevent them from thriving. In cases where the grubs become lodged in positions which communicate with the brain, brain symptoms may develop and death would result.

Prevention and Treatment.

Actual treatment of affected sheep is only rarely successful, and is therefore not recommended, except in cases of valuable animals badly infested. Preventive measures, however, can be adopted. Shelter trees and plantations should be provided in all paddocks. The ploughing of a furrow across the pasture paddocks when the flies are active provides a small bank of soft earth into which the sheep may push their noses.

Finally, smearing the noses with a preparation, such as Stockholm tar, is recommended. It is advisable where practicable to apply by hand the first time, then to use a covered lick trough in the top of which are several 2-in. holes. Stockholm tar is kept smeared around the edges of the holes, and the sheep when using the trough get a coating of the tar on their nostrils.

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AVERAGE PRODUCTION OF FRIESIAN HERD SINCE 1927-28

Year.	Number of Cows in Test.	Milk.	Test.	Butter Fat.	Butter Fat lb. with allowances for Heifers.
		lb.	%	lb.	
1927-28	14	9,177	3·67	336·85	399·21
1928-29	10	13,644	3·41	465·24	512·74
1929-30	10	11,831	3·40	399·45	456·95
1930-31	13	12,763	3·43	431·92	500·01
1931-32	10	10,116	3·69	369·00	417·00*
Average for five years 57 *cows*		11,409	3·50	397·45	460·98

* In 1931-32 the allowances for heifers were reduced. Under the old scale this average would have been 429·00 lb.

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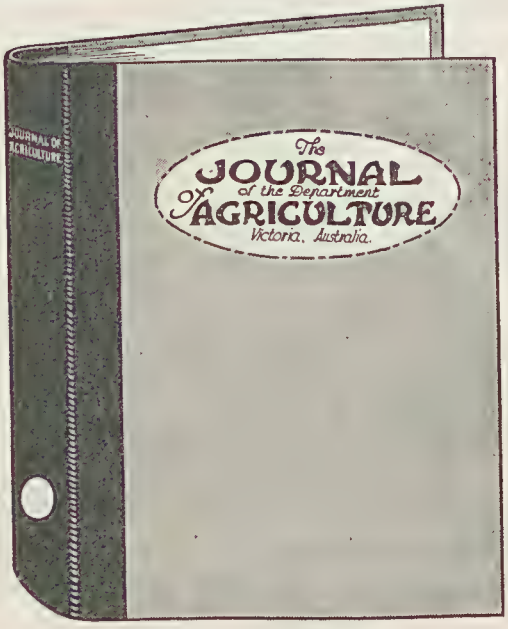

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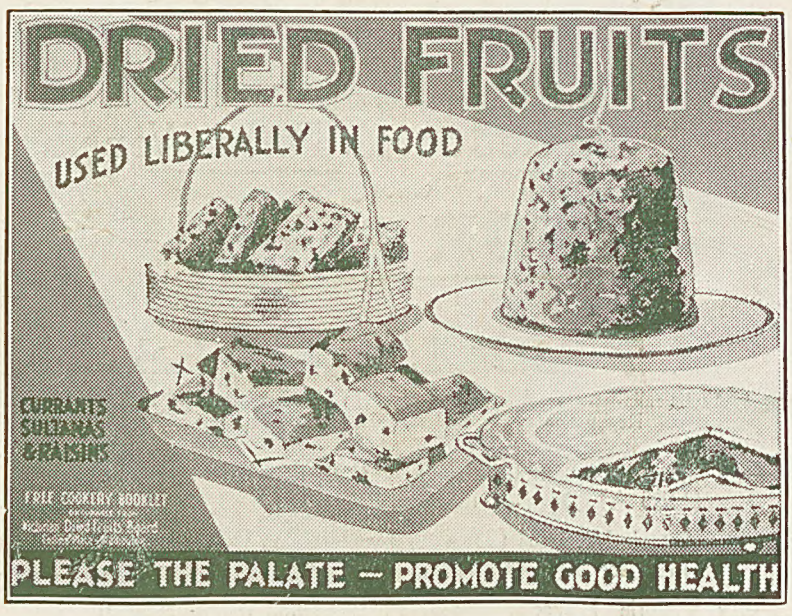

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